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NATO'S NORTHERN FLANK



The paper on page 31 indicates some of the medical problems encountered during the deployment of Royal Marines to Norway for Arctic warfare training. Here a Norwegian stretcher is manuevered by the troops.

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## Editorial

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Reaching the end of my spell as the Editor of this Journal this, my predecessor I must record my gratitude to the Editorial Society, the Editorial Committee and the subscribers and put on record my appreciation of the task entrusted to me. In fact, I too welcome my successor to Editor Surgeon Rear Admiral E. E. P. Bernard Q419, who takes over as Surgeon Rear Admiral (Executive of Naval Medicine) and Dean of Naval Medicine on February 4, 1982.

A glance at my predecessor's closing editorial reveals some general observations on the situation of the Medical Service as he perceived this two years ago. It is tempting to draw some parallels and contrasts. At this time he ended on a note of considerable hope. After a decade of unarguably reduced resources he concluded that the greatest single need was "more people, particularly medical officers," and implied the belief that this might be achieved in the interim. How does this contrast with the situation facing us in 1982? We are more likely to have to make do with less. Clearly the very real and widespread concerns throughout the Branch as throughout the Navy about individual future careers casts a shadow on most other considerations. In addition to personnel and domestic, career within our Branch there is equally widespread concern as to whether even an individual medical officer's own position is secured, a further clouded down medical career can provide him with the professional satisfaction that he not only wishes but really needs if the situation of the past two decades is, so he concludes, not

likely to be maintained only in the respect of clinical practice, clinical research and operations, supported in individual operations and sub-specialties, continuing to provide the teamwork that modern therapeutic and preventive medicine has become.

At the end of the twenties it was frequently argued that the Medical Service had reached an inevitable maximum that substantial areas were and undoubtedly still are, greatly over-stretched. We had steadily reduced our numbers while in the main, for excellent reasons, at the time steadily increasing our level. Modern approaches and techniques had not resulted in economy of effort indeed, generally on the reverse. While on the face of it it is argued that a smaller Navy requires a smaller Medical Branch in reality, even the case of many other naval specialized branches, the breadth of general professional knowledge, experience, and practice required of any medical officer has enlarged enormously in the military medical areas the depth of experience he must possess has advanced pace pace with military technology. This extra knowledge required of the Service doctor at all levels, in general as well as war, compared with his civilian colleagues reflects both the stress on the individual and the size and scope of the force to support him. How then will we cope in these circumstances? Whatever the real cause, the manner of going to meet the emergency must be such that any likely cost. When we know that not this time we meet on the task of the Medical Branch

we must concentrate more effectively our efforts where they are most needed, we must utilise fully expertise at whatever level and wherever it exists. Further use must be made of professional services and appropriate training supplied areas of activity that are not essential to the primary task, directly or indirectly must be pruned, but the essential balance of the Medical Service and its self generating capacity must be preserved. Paradoxically, if we can achieve this by planned pruning as a result of the rational reshaping forced on us in the regions where we failed to accommodate the shifting needs of the services, it should be possible to achieve a new balance and eventually correct the overstretch.

Closer to home, the stress that the Navy is undergoing is being mirrored by a crisis in the revenues of the Journal. The JRMMS has unfortunately been self financing and does not defend advantages in keeping it so. As the same time the possibility of its publication as an official HMSO publication paid for by the Crown has also been examined. Quinquaginta years of a certain loss of editorial freedom that this would entail, information received indicated that it was, predictably, extremely unlikely that this could be achieved in the present frayed financial climate.

Your Editorial Committee have regretfully concluded therefore that an increase in subscription must be considered probably in the next future. A defence against has, however, been postponed to allow the

Medical Director General (Naval) as Chairman of the Board of Management of the JRMMS, to take certain measures designed to increase the circulation amongst serving members of the Royal Naval Medical Service, and at the same time, maintain the possibility of a limited subsidy from other sources.

Against this background the Editorial Committee would like to know subscribers' views on future levels and content. There have been kept very much to the original mould in order to position, primarily a forum for original papers by members of the Service, with a publishing of a number of more general and historical interest and current Service news. It has been suggested that in the interim for some years, if a Medical Department Bulletin, serving subscribers might like more space devoted to Service news. Proposals have included more comprehensive coverage of medical officers' appointments, news abstracts from medical officers' journals and more substantial articles to increase the "house magazine" balance. With current publishing costs this could only be achieved at the expense of space allocated to professional papers. The Editorial Committee would welcome your views. Do you like what you receive or do you wish to change it in balance or emphasis?

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- 1 Editorial Committee (JRMMS) 1990/901/2

## Environment in Medicine — HM Ships at Sea

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### Part II: Motion Illness

A literature review of the subject motion sickness starts in Greek mythology. Hippocrates wrote that "sailing on the sea proves that nature disorders the body. Truly that has been written many dangers with seas. Anaxarchus, reputed to be a Greek philosopher, lived 4th century BC, and obviously seafarers divided people into three classes: the living, the dead and the sea sick. The very word *nausea* is derived from the Greek *naus* meaning a ship. More recently, history describes such eminent British sailors as Sir John Franklin and Admiral Lord Nelson as sufferers. It would seem that the ability of the human was undoubtedly reduced by the conditions in that he is described as being unable to take charge of his ship until it had passed the fury of the sea. Nelson, however, despite being a chronic sufferer who adapted, but poorly to the continuous motion of long periods at sea, could hardly be said to have had his performance adversely affected.

Perhaps it is this fact of history together with many unpublished and anecdotal examples of excellence in performance by sailors under adverse conditions of motion at sea that has led to the opinion held by many that when motion is reduced, man's performance is little affected by ship motion. But is this true? Or are those the exceptional few? What is the effect of ship motion on those sailors and in particular what is the overall effect on individual performance and on the per-

formance of the ship as an effective or fighting unit? Baker's review of the literature on motion and human performance<sup>1</sup> indicated how little was known of its effect despite the fact that motion sickness is common during military operations, when performance is so important. It is those questions that provide the motive for the Institute of Naval Medicine's present studies and research in motion sickness and ship motion.

### Signs and Symptoms

The condition motion sickness was so called by Irwin in 1950 and the term was popularized by Sir Frederick Banting during World War II. The syndrome is better described by the more modern phrase in that it is now generally agreed that actual vomiting is only one of its characteristics. The most frequently reported symptoms is nausea. The latter is profoundly unpleasant, usually starting with a sensation of queasiness about the fifth day after arrival, often known as stomach discomfort through increasing degrees of queasiness until actual vomiting occurs in the third or fourth motion crises. Vomiting brings about marked relief of nausea in some sailors and sometimes leads to a complete recovery of well-being. However, in other sailors the nausea persists leading to further bouts of vomiting and a decline in well-being. This may, on occasions, become so well established a cycle that it persists long after the stomach

being to team has suffered. Now it is revealing increasingly the worst subjective aspect. A number of competent individuals report that they find a difficulty to sustain and these poor subjects tend to sustain only parts of acute scenes but long periods. I dwell on this state of subjective misery as my interest lies in the effect of this condition on the ability of the subject to carry out his duties in a continuously moving environment. A multi study of other clinical signs and symptoms are detailed in Money's physiological review of motion sickness.<sup>2</sup> They include such as sleepiness, spatial disorientation, giddiness, mental confusion and indifference to surrounding situations. He also lists a number of papers describing reduced performance of differing psychological and performance tests and consequences in various studies in a moving environment. However, Baker expresses surprise that so little is known of the overall effect of motion sickness on performance, especially in motion sickness, it is common during military operations where performance is vital.<sup>3</sup> In general it is thought that motion sickness merely reduces motivation but that if subjects are willing to force themselves to overcome this they can usually perform to a normal standard for a limited period of time. This period of time is likely to vary considerably between individuals and with the severity of the motion stimulus. There can however be little doubt that all performance tests or observations during actual training

#### **Incidence**

The incidence of symptoms due to motion varies with the level, the frequency and the duration of the stimulus. It is generally held that given sufficient stimulation of the most sensitive frequency, all people with intact and normally functioning labyrinth can be made to suffer from motion illness. Figure 1<sup>4</sup> shows a three dimensional represent-



Fig 1 Three dimensional representation of the various studies of motion sickness incidence as a function of frequency, duration and amplitude for 2 hour exposure to vertical sinusoidal motion.

and acclimation levels for a few hour exposure to vertical sinusoidal motion. This suggests a maximum sensitivity to motion frequency around 0.17 Hz which agrees with most studies. It seems likely that it will no longer approximate the frequency sensitivity as can be seen after the incidence against mean levels of vertical acceleration. A number of references record incidence at sea during military operations. Tyler<sup>5</sup> reported that 17% of troops within landing craft were made sick by a mild swell and that 40% were sick in rough seas. Chinn and Smith<sup>6</sup> suggest an incidence under certain conditions of 100% and Helling et al<sup>7</sup> reported an incidence as high as 70% in small boats in severe weather. Daniel<sup>8</sup> suggested that the incidence of vomiting on the sea might be as high as 60% in several situations, such as that it has probably contributed to many deaths by reducing dehydration. Brown and Head<sup>9</sup> state that "modern developments in naval warfare have done little to alleviate the problem. The greater reliance now placed upon sophisticated electronic weapons control and search systems has resulted in more of the ships key personnel being confined in small dark, hot compartments where they are conditioned by a distinctive equipment pattern of their own. First hand reports from ship's officers suggests that the incidence of motion sickness under these circumstances is alarmingly high and under review

with illness, a higher proportion of the vessel's top 100 countries have been reported.<sup>11</sup>

The vestibular system of all will have a population of neurons where threshold and susceptibility to motion illness will vary considerably, yet mutually all could be affected should the stimulating motion be sufficient. What is less certain is the point at which individual performance will start to deteriorate due to motion illness and under what conditions the effect on individuals will accumulate to the level where the ship's of today in a state of war is affected. Nor has it been possible to the point to predict with any accuracy what the sea sickness of motion illness in a particular type of vessel or a particular sea state will be. It is contended that we need to be able to answer these questions. We should also be able to advise how best to mitigate the effects of the sea's motion to advise what limit of movement are available and what the effectiveness and side effects of such treatments are likely to be as related to a man's ability to carry out his tasks.

### Legacy

A vast literature exists on the pathology of motion illness, some with a scientific basis and some relying on the mystical. However it is true to say that only two theories are seriously considered at this time one being the theory of over stimulation of the vestibular apparatus with area of symptoms in the central nervous system and the other that of sensory conflict within the central nervous system with what Reason and Brand describe as a "normal mismatch".<sup>12</sup> Of the two the latter would seem to better fit the known phenomena associated with the condition within the individual.<sup>13</sup> It also fits Reason's hypothesis that motion sickness may be a by product of an evolutionary protective mechanism.<sup>14</sup> He suggests that rejection of a sensation, strong which allows sensory input or motor control associated with visual, vestibular or proprioceptive mechanisms may cause a sensory mismatch and result in

vomiting and expulsion of the contents of the, long left in the stomach.

An adequate theory of motion must account for such facts as:

1. Symptoms can be induced not only by motion in which changing linear and angular accelerations are experienced, but also by purely visual stimuli as a illusory environment such as have been reported in German film shows.
2. Adaptation to the provocative motion can sometimes be lost at least partially when the nature of the motion changes.
3. Symptoms can occur when such stimuli as a normal motion environment after having adapted to an artificial one.

Undoubtedly as has been stated the vestibular apparatus has a critical role in these patients without vestibular function do not get motion sickness.

Central to Reason's neural mismatch theory<sup>15</sup> when motion illness is provoked information from the eyes, the vestibular system and other receptors filtered by the motion environment is compared with the individual's expectancy from past experience. Reason's theory proposed a model (Fig. 2)<sup>16</sup> in which within the central nervous system there is a sensory store and with it a comparator where signals from the sensory receptors and the "store" are correlated. If they match all is well but when the two inputs do not agree with the expected or stored information, then a mismatch signal is generated. This signal has two effects: it starts to modify the stored information and



Fig. 2 Diagram illustrating the neural mismatch theory of motion sickness.<sup>16</sup>

a function, the neurovegetative responses comprising the motion sickness syndrome. Such responses are dependent on the duration and intensity of the movement signal. A constant strong movement is likely to result in vomiting and a significant and increasing neurotransmission of the state. A weak sustained stimulus, on the other hand, may encourage the state, resulting in adaptation to the situation without preceding symptoms. A visual representation of the response of veins to transfer from one motion environment to another is seen in figure 1. The way in the sensory response to the change in motion, the slope, the gradient modulation of the state, and the dotted area, the degree of movement. On the return to the 'typical' environment a further short period of instability occurs. If transfer from one specific motion environment to a rather frequent modification to the state may be facilitated and become much more rapid to that the movement is short lived and may not generate symptoms. It would seem also that there is some variability between the ability of individuals to 'adapt' their state.

Mean shift signals characteristically arise on the move between either the eye and the vestibular apparatus or within the vestibular apparatus, or between the semi-circular canals and the otoliths.



Fig. 1 Diagrams illustrating the time course of the differences of the state due to exposure to an input of the vestibular motion environment and its effect on the neurotransmission.

Onboard ship the mismatch between visual and motion-receptors can be produced by a person at the end of a plying, lowering and rolling vessel watching motions even motion close to the ship. In the same position, by watching the distant horizon, the mismatch can be reduced to a minimum. A lesser mismatch occurs onboard unless the ship when the out-reaching structures are relatively stable within the visual field while the labyrinth is stimulated by motion. It has been suggested that the mismatch between the otoliths and the stabilis may be generated in at least arranged in ship movements by random, any fixed movements in response to the ship's movements and by voluntary head movements.

There are wide differences in susceptibility between individuals but, in general, a person exposed to one motion environment is likely to suffer less by moving to other motion environments. Susceptibility changes with age. Seaborn is not before two years of age. The incidence then increases markedly reaching a peak in puberty and declining quite rapidly between the 13th and 15th year. Susceptibility then commences to decline but more slowly. Why this occurs is not understood but it may be due to long term adaptation or to a reduction in sensory sensitivity.

It has also been noted that women are more susceptible than men of the same age and that there appears to be some hormonal influence, in that it appears to be increased during menstruation. Susceptibility is also reported to be increased in pregnant women.

Research suggests three other individual factors affecting susceptibility — receptivity, adaptability and sensitivity. Receptivity is described as the facility with which the individual translates and processes the sensory stimulus; the higher the receptivity the more intense the subjective sensation and the more the likelihood of motion symptoms. Adaptability is described as the rate at which the aforementioned 'state' is



applied and direction, in which the subject will "adapt" to the applied nature. The slower the adaptation the more likely the symptoms are to appear due to a prolonged stimulus and the more severe they are likely to be. Naturally subject to differences between individuals in the retention of adaptation. The higher the exposure, the more frequently symptoms are likely to occur as a variable/longing motion environment. The three factors were clearly separate and have no correlation between each other as the degree to which they are present is very individual.

However they all have an influence on susceptibility and this is represented diagrammatically in figure 4. Susceptibility to motion sickness increases with the length of each wave. The least sensitive of people would be represented by short waves close to the center. It should be possible to measure personal reaction rates in personnel with special duties or responsibilities likely to be adversely affected by motion sickness and to classify those likely to be most affected. Aside from selection of those affected least there are protective measures which can be taken to reduce the effects and to limit the conditions where it occurs. One might measure their return throughout the

literature, both experimental and anecdotal is the reduction of head movements. Both voluntary and involuntary head movements in a moving environment increase the magnitude of motion illness and may indeed induce it in conditions which would otherwise be non-inducers. Restriction of all unnecessary head movement and the design of jobs to eliminate or reduce head movement to a minimum would be a step in the right direction. Even a neck collar to limit unnecessary motion might be of value. In the use of binoculars or other visual aids a stabilized image reduces symptoms and improves visual acuity. Where a visual display is employed with a moving picture it, for example in an electronic sight, the display should tilt in line with the visual field as it precesses and again the image should be stabilized. Within the constraints applied by the wind and waves, hull design can have a marked effect on a ship's motion. The design authorities now have available the considerable knowledge gained by the Admiralty Marine Technology Establishment on the seakeeping of ships and on the effect of stabilizers. It should be possible to minimize the symptoms generating motion within certain limits. It is important also to avoid frequencies of motion and motion rates profiles likely to disturb other vital systems or cause damage or systems on board but at least it should be possible to avoid increasing energy in the peak area at 0.17 Hz.

The most potent therapeutic measure is adaptation. A ship ready to sea after a period drydock is the one most likely to suffer a performance decrement due to motion and is not adequate for regular sea time and a short time for adaptation to take place before a unit is fully operational. Both the above would prove impracticable and uneconomically boring. Discrimination of key personnel in a manner similar to that carried out by the crew by Dr. Rowan at the Institute of Anglian Medicine, Portsmouth<sup>12</sup> might be a possibility.



Fig. 4. Diagram illustrating where factors which determine motion sickness susceptibility have influence: a number for the degree and in the direction of the susceptibility is a scale of motion sickness and the length of the wave.

### Drug Therapy

Many cases can be partially prevented and, to a degree, treated by drug therapy. A number of drugs have been shown to be of value but none is totally effective and all have side effects which may affect performance. Figure 5\* indicates the protection that may be expected from different dosages of one of the most effective drugs, 1-hydroxy-2-naphtholamine. The lack of complete protection should be noted. The protection indicated is that over and above the minimum following a placebo. The dosage is then given orally before exposure. Although not a likely to be given after motion has commenced, especially in personnel already affected by symptoms. Little knowledge is available on blood levels of bromine in relation to the levels of protection afforded and work has commenced at this Institute on an endeavour to establish this knowledge. Other drugs, such as primatekation, diphenylhydramine, ephedrine and reserpine are known to be of value. However, some studies have shown their effects on individual work to be more variable and to provide less protection than bromine.

As mentioned, all these drugs have their side effects, some of which can be marked. All are central depressants and must have some effect on the performance of skilled tasks. The symptoms reported effects are evidence of a varying level of stability in concentration, increase in heart rate, muscular weakness and tiredness. It is worthy of note that nerves are not normally permitted to use such drugs.

Transdermal absorption of bromine is now available and has Institute in collaboration with Leeds University Department of Physiology has commenced work on this effect. Blood levels and effects on performance of this potentially valuable method of treatment. It is required to provide sustained low therapeutically effective blood levels with minimal side effects. However, some subjects using a drug



Fig. 5. Protection against motion sickness with 1-hydroxy-2-naphtholamine in 5 levels of placebo (indicated). Note the approximate shape of the curves and all 100% protection (100%) protection curve with a dosage of 1.0 mg/kg.

internal work have already reported some characteristic side effects and a subjective decrease in performance and constant nausea. It is hoped that when the IWM studies are completed it will be possible to recommend a minimal effective dose of bromine which will have acceptably little effect on performance. Similar efforts will be made with other regularly used anti-motion sickness drugs.

### Conclusions

From what has been stated in this paper and in Part I (Pittman 1940, pp. 123-124) it is clear that there is a strong argument, supported by valid experimental evidence, that human performance of many skills and tasks required on board a warship are degraded by the presence of the ship motion. These include heavy manual tasks, fine manual control skills, vigilance tasks, and possibly even decision making skills. We will know the characteristics of motion which have the greatest effect on motion sickness and can attempt to minimize them in the future design of ship hulls. However, in doing this and in the use of stabilizers on hull design, we need to avoid the characteristic of motion which degrades manual and psychomotor skills and here we have much less information available to assist in design. Ideally, detailed study of the effects of the

whole spectrum of sleep motion on selected displaced tasks or selected task elements is needed. To do this on controlled conditions an adequate motion simulator is required.

Similarly more experimental evidence, of the effect of motion illness and its various constituents, on performance in conditions of real or simulated motion is needed. Awareness, knowledge, of the susceptibility and adaptability of the general naval population is also required. For particularly sensitive tasks it may be valuable to select personnel with low seasickness and high adaptability and resistance to motion illness.

Some studies, whose design flaws have already been noted. Others are planned. A motion illness survey is being carried out in the Fleet to define the population's susceptibility. A motion illness generator has been designed and built for HMS, in the form of a rotating chair with a pivoting tilt facility. It is intended to enhance the effectiveness of a number of anti-motion sickness drugs against the motion of the device. It is hoped these studies will include the effective seasick fluid levels of the drugs. It is then intended to measure the effect of these genetic levels of these drugs on certain psychological tests of performance and regularly at HMS. Ideally the latter should be repeated in the controlled environment of a motion simulator but no adequate simulator is available at this time.

It is considered that a controlled motion platform equipped motion in six degrees of freedom and with a considerable vertical stroke of 10 metres or more will eventually be required. The cost would be considerable but the technical knowledge is available in

the several available industry. As an interim solution a large sea project available at the Royal Naval Establishment, Portsmouth, which could be converted to a vertical motion platform capable of a 5 metre stroke and much of the required work could be carried out on this device.

In recent months two operations, relating to the motion of vessels have been noted. One, concerned substantially sleeping accommodation on smaller ships, the other a motion specific to a new concept of heavy craft operations. Both could have been answered quickly in the laboratory had an adequate simulator been available.

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## Occupational Health Problems and their Solution

Tyegreen Leadership Committee J. E. Hayden MSc MScUP APTM ICH ECHSNCSC EN

### Introduction

The practice of occupational health is concerned with the recognition, evaluation and control of problems arising in the person/work interface. It is a team effort which involves physicians, hygienist and those supported by services available, for example from University laboratories and the Institute of Naval Medicine. This paper reviews the team effort concerned to find a solution to a day to day shop problems involving safety, shop designers and some others.

### Recognition

In general terms recognition involves an acquaintance with the work problems and a knowledge of the raw materials used, their storage and handling their potential for contamination whether it be by labelling them dangerous or dangerous and of the end product and its subsequent function.

### Exposure

Exposure is based on the qualitative and quantitative measurement of exposure that is by monitoring the environment and/or workers and comparing the measurement with established criteria for the substances used. These criteria are known as hygienic standards and represent acceptable occupational exposure levels such as the TLV which is the time weighted average airborne concentration of the substance in which workers may be exposed without harm for eight hours a day 40 hours a week, during a working lifetime. Sometimes, in higher concentrations, may be allowable for short

periods of time, in some circumstances STEEL — Short Term Exposure Limit. The difference between exposure to the specific work situation and the hygienic standard will demonstrate the need for control.

### Control

Control may involve one or a selection of measures such as:

1. Substitution — replacement of a toxic component by one which is less toxic or not toxic.
2. Segregation — enclosing a reaction which produces toxic concentrations by isolating geographically in a more hazardous machine for example.
3. Local exhaust ventilation which removes hazardous fumes, vapour or dust at the point of their production.
4. General ventilation suitable for diluting low toxic substances.
5. Wet methods suitable for dust producing work processes.
6. Personal protection designed principally to avoid skin contact or inhalation.
7. Health education — increasing both management and workforce in safe working practice.
8. Routine monitoring of the environment eg in the wake of debugging and lagging.
9. Routine monitoring of the workers who involved in handling toxic substances such as lead.

### The Problem

One example of a potential occupational health problem arose in the wake of a Desford solution to preventive health problems highlighted during shop?

requirements—namely the joining of wooden wall surfaces, and equipment in load handling areas. All load bearing regulations require that surfaces bearing contact with loads be smooth, impervious and dry to clean. This prohibits surface irregularities which attract and retain dirt and may harbor organisms contrary to good food hygiene practice. Cracks, gaps and steps exist in the position of wooden wall surfaces and could not be opened up by the flexing of the wall allowed by design.

Gully work surfaces must be paved using a chipping compound which is both inch weight and hygienically acceptable. The technical requirements are that it should be flexible, heat resistant and adherent. The public health requirements are that it should be hard, have a hard smooth impervious surface and not lose its compactness by breaking when in contact with loads.

Isolating compounds already in use and approved for structural and structural contact with food presented a "high surface drag" block after curing and were therefore impossible to clean. Although claimed by manufacturers to be heat stable up to 750°C, these compounds could not of the change when the machines were introduced. The maximum temperature of the outer casing of working equipment is specified as 80°C and lower (20-25) where operator contact could occur in the normal course of his work.

#### The Solution

The ideal solution might seem to be to add all work surfaces together but because of the special techniques and equipment required for studies and this would have to be done in a workshop situation. In the life of a hall there would be at least three major and a few minor refits during which gully equipment is dismantled for its own replacement and to facilitate the process most of underlying support structure

Removal and replacing, large blocks of machine used would involve safe chipping routes which is contrary to the modern chipsheding principle of keeping them in the machine.

#### Technical Considerations

An epoxy resin system, proposed and tested on an experimental basis in a limited machine was found to meet all the technical requirements. It was the subject of a test, impact analysis, which showed it the contact with loads and formed the basis of a safe working practice for installation in food handling areas. The system in question was a two pack epoxy resin capable of withstanding appropriate conditions of loading without physical change.

Epoxy systems are usually solvent and, with appropriate additions, make suitable cappings on the public machines under the normal product is impervious to water and generally more so than in contact with loads. It is unaffected, however, in circumstances of the common parts of the packages is required to exclude solvents work in water or solvents which may be used by infection or other contact. The two compounds are analysed in the table.

**Table**  
Epoxy Resin compounds and technical data

Compound	Technical Data
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
47	48
49	50
51	52
53	54
55	56
57	58
59	60
61	62
63	64
65	66
67	68
69	70
71	72
73	74
75	76
77	78
79	80
81	82
83	84
85	86
87	88
89	90
91	92
93	94
95	96
97	98
99	100

1-10: Compound 1-10 are available from 1-10 in 100g and 500g quantities.

11-20: Compound 11-20 are available from 11-20 in 100g and 500g quantities.

### Aluminum Powder

Inhalable aluminum appears to be physiologically inert when administered by any route, provided that it is not associated with substances that are toxic irritants. There are reports of inhalation of finely divided aluminum powder causing pulmonary fibrosis, but the causality of this is uncertain and is almost certainly associated with the presence of aluminum compounds together with other irritant substances and not with metallic aluminum alone.

### Regulated Index of Hazardous A

The liquid members of the group are potentially non toxic per se, but its physiological system effect results from inhibition of liver enzymes or disruption of the coenzyme route. The solid ones are inherently innocuous. All these compounds are, initially irritating, but they do present a major dermopathy problem on contact with the liquid type frequently causing discomfort. Properly sealed atom systems are, generally safe.

### Potential Hazards of Spray Resin Systems

1. Skin, and eye contact with formulation during preparation.
2. Eye contact with vapour from handling.
3. Inhalation of vapour from handling.
4. Inhalation of dust if cured product is mechanical.

### Precautions

1. The product should be stored under conditions of good ventilation. In a confined space, the vapour concentrations may rise to a level where irritation of the eyes and mucous membranes occurs. If such irritation is experienced the vapour concentrations must be reduced by means of additional local ventilation.
2. Skin contact with either part used with the, mixed products should be avoided by the use of gloves of nitrile rubber or PVC.
3. If the cured product is mechanical

exposure to airborne dust should be subject to control preferably by a hood with both an extraction or by separate local exhaust ventilation, or by the wearing of a potential purpose dust respirator.

4. Eye contact with the dust should be avoided and suitable eye protection is to be worn as necessary.
5. No detailed toxicological data is available on the acceptability of the mixture, as intended had contained contact with food. However, the degree of solubility, toxicity and the inertness of the properly stored resin would indicate such acceptability.
6. The product will irreversibly soften at high temperatures and a limit of 200°C is thought reasonable.
7. Irreversible thermal degradation is likely at temperatures above 200°C.
8. Application of the formulated compound should be to a cool surface only. Warmed surfaces will increase the vapour hazard.

### The Working Staff

The initial monitoring the precautions at (top floor level) talk to how management supported by the occupational health nurse as he rate as health education taken to some of the members of the medical assistant in a shop. She will also advise on protective clothing, personal hygiene and skin care. She will conduct routine monitoring of the environment as required and is the prime contact of the occupational health service with the workforce at risk.

Two major problems were considered apparent at the outset of this investigation: the method of mixing and spreading the resin to give a satisfactory surface during the transmission of food waste in shops, and the potential hazard of its accidental contact with food in the final analysis member has proved both waste of a problem. This spray system is free of splashes and does not require machining once in acceptable surface may be obtained using water and a float during the curing phase.

**Conclusions**

The possibility of having dirt traps in food production areas remains a low incidence of frequently unsupported observational report in shops. Companies increasingly rely more and more on an expensive network of food processing. The risk is presently being

quantified in short-pulses using a technique developed from that used by a shop inspection group in Southampton. There is little doubt that an outbreak affecting a significant proportion of a shop's company would seriously endanger its operational capability.

## Rehabilitation after injury

Edmund (M) F. Reed MRCSP-UK

### Introduction

Disability may be temporary or permanent. The cause and course of disability tends to follow one of three patterns. The most common form of disability comprises within loss of function followed by a gradual recovery to pre-morbid levels of fitness. Examples would be the temporary disability following head injury (trauma or fracture). The second type is characterised by a gradual decline in function ending in death or severe permanent disability; the example used here is multiple sclerosis. A third type of disability is that of congenital loss of function, as in cerebral palsy where there is early impairment which is often followed by decline in spite of formal treatment. All three conditions have differing requirements from rehabilitation services. The main aim in the second and third type of disability is to facilitate the person's social rehabilitation, allowing him to make the best possible use of his remaining function. Maintenance and support are the key.

This paper discusses the rehabilitation of servicemen who usually suffer a disability of the first and most common category. Rehabilitation in such cases is part of the overall management of the acute phase of injury and is under the direct control of a doctor. It is however based mainly on physiotherapy and medical services at the Rehabilitation Department.

There are approximately 70 000 per year on the Royal Navy. In 1978, the latest year for which full statistics are available

15 000 of these men were hospitalized through injury and they represent 20% of the total admissions to hospital. Following hospitalization such patients are prevented from undertaking full naval duties for a variable period and they are usually made unfit down graded during this time. A total of over 40 000 non-effective days resulted from hospital admissions and sick leave in 1978. In a small highly trained service this results in great turbulence of drafting and reduces the effectiveness of the Fleet.

The main causes of injury relating to training are shown in Table 1 which demonstrates the number of effective days lost. Without severely restricting the activities of our Servicemen it is a difficult problem to reduce the number of injuries. However, in order to reduce the number of men unfit for just one day during training from their injuries, ways to speed the return to full duty must be examined and capitalized upon.

Following definitive treatment for injury a Serviceman is placed in a medical category which dictates the range of duties he may perform. It may also dictate that he must work in a particular area so that facilities

Table 1  
Main causes of injury and effective days lost.

Cause	1978 (1)	1979 (2)	1980 (3)
1. Falls	1	1	112
2. Road	1	1	15
3. Gun	1	1	10 000
4. Other	1	1	100
5. Total	4	4	10 138
6. Total	4	4	10 138



are readily available for his further treatment. For men in medical stages three and four, the only place they can usually stay is their First Accommodation Center at Hampshire Hospital in Norfolk. A random check carried out in February 1981 showed that 60 personnel, which is roughly the size of a company of a large hospital, were in these First Accommodation Centers in a medical medical category 12 this number. 20 were there because of orthopaedic conditions, the figure does not include hospitalized men, those in designated categories or other disabilities, who are not in the going appointments of these or such leave.

#### Statistical Perspective

Conclusions are used when several persons have completed their continuous hospital treatment but are not yet in enough to return to a unit area in a medical category. The concept of active rehabilitation programs for these men is not yet. Medical treatment has progressed over the years from the use of flow lights to automatically located and efficient systems. It is the most which needs to be effective with a specific, has towards the recovery of the injured Servicemen if we are to improve the figure shown in Table 1. The first principle of active rehabilitation were laid down during the 1940s war by then command surgeon Robert Jones who created the active working principle. These work-shops were the precursors of today's occupational therapy departments. Occupational therapy was therefore not out in the ground but as the system. Between the wars, links between war work. During the Second World War specialists of various clinical disciplines in the Armed Forces combined to establish the modern approach to full time intensive, orthopaedic rehabilitation. Men were made to convert natural recovery into rehabilitation.

The Royal Navy at this time took over a large house and grounds on Bessley

Cumman in Kent, and converted it to become the base for a rehabilitation unit. The staff consisted of two medical officers and physical and recreation training staff plus two sick berth party officers. At this time the history of physiotherapy in medical grounds was not known. Nevertheless, the rehabilitation proved effective. A breakdown of cases of injury admitted to the center shows that a greater percentage of injuries were caused by football and organized games than by enemy action. (Table 2)<sup>1</sup>

Recently Home closed after the war and since that time the Royal Navy has used the two First Services Medical Rehabilitation Units at Bessley Court and Chislehurst, however, only a small percentage of post injury cases are sent to these centers and these are mainly the most severely injured. The remainder are now efficiently dealt with within the Royal Naval Hospitals. Both home hospitals now have rehabilitation departments headed by a Consultant and a Senior Specialist and the facilities broadly consist of an out-patient department with the normal range of various treatment devices. There is additionally a provision of adequate provision for group therapy. There is a hydrotherapy pool and an occupational therapy department. RNL Haver has one full time and one part-time occupational therapist. In the case of land injured patients, the clinical psychologist attached to the psychiatric department and the speech therapist are used a great

Table 2  
Cases (1940)

Injury		Cause	
1. 1st	2. 2nd	3. 3rd	4. 4th
5. 5th	6. 6th	7. 7th	8. 8th
9. 9th	10. 10th	11. 11th	12. 12th
13. 13th	14. 14th	15. 15th	16. 16th
17. 17th	18. 18th	19. 19th	20. 20th
21. 21st	22. 22nd	23. 23rd	24. 24th
25. 25th	26. 26th	27. 27th	28. 28th
29. 29th	30. 30th	31. 31st	32. 32nd
33. 33rd	34. 34th	35. 35th	36. 36th
37. 37th	38. 38th	39. 39th	40. 40th
41. 41st	42. 42nd	43. 43rd	44. 44th
45. 45th	46. 46th	47. 47th	48. 48th
49. 49th	50. 50th	51. 51st	52. 52nd
53. 53rd	54. 54th	55. 55th	56. 56th
57. 57th	58. 58th	59. 59th	60. 60th
61. 61st	62. 62nd	63. 63rd	64. 64th
65. 65th	66. 66th	67. 67th	68. 68th
69. 69th	70. 70th	71. 71st	72. 72nd
73. 73rd	74. 74th	75. 75th	76. 76th
77. 77th	78. 78th	79. 79th	80. 80th
81. 81st	82. 82nd	83. 83rd	84. 84th
85. 85th	86. 86th	87. 87th	88. 88th
89. 89th	90. 90th	91. 91st	92. 92nd
93. 93rd	94. 94th	95. 95th	96. 96th
97. 97th	98. 98th	99. 99th	100. 100th

shall. In addition to the full complement of physiotherapists, in these hospitals there is an administrative officer who controls the day to day running of the Rehabilitation Service. The larger establishments such as HMS Nelson, Portsmouth, Culterham, Ryehouse, Basingstoke and RNR Gibraltar have a physiotherapist on complement who is proving most efficient.

Royal Marines have three qualified medical gymnasts and have since again started training gymnasts in the Joint Services School at Woolwich (JSSWBG). For periods in their career these men have at the Culterham training centre. Royal Marines at Lympstone in addition to three medical gymnasts, the centre has two physiotherapists. It is considered an efficient model in a peripheral service, a rehabilitation unit. Any period required during the rigorous training is regarded with one of the two formal rehabilitation stages, those are called Phase 1 and Phase 2 after the famous books. These Royal Marines spend the whole day, every day, in a programme of remedial exercises and specific treatment.

With an educational period or two to maintain balance and morale. The medical relief of this peripheral unit was liberally considered on in 1970 by Surgeon Rear Admiral Taylor who Surgeon Rear Admiral (Rings & Establishments) who stated that it was considered to be of paramount importance the recovery of Marines under training.

If rehabilitation is prescribed following hospitalization it usually starts after considerable lapse of about two weeks. In most cases the two main lay-off collagen muscle strength and endurance and a long period of treatment is required to recover the deficit. Consequently effort on work is considerable and it is likely that the working hours for certain conditions work as a disadvantage probably rather than. There is not much evidence to suggest that early active rehabilitation programmes on a full time basis markedly reduce the

recovery time from wounds to full duty conditions.

In 1966 Wynne-Harry and Nicholls studied 100 patients who had undergone a Phase 1 operation for recurrent dislocation of shoulder and were transferred to the Joint Services Medical Rehabilitation Unit at Chatterbox. Their trial showed that full time rehabilitation gave improved results, after operation on the shoulder which were not obtained by the usual practice of out patient physiotherapy. While the full time support the patients were fit to return to full duty 10-12 weeks after operation. Those not receiving this type of regime took five months or longer. In the study the criteria for release back to duty were that the patient had full abduction, forward flexion and internal rotation together with 30° or more of external rotation. In addition they were required to have confidence in the shoulder.

Nicholls and Payroll studied 74 patients with multilateral fractures. Their trial showed that patients arriving at Chatterbox later than second post-plate work required considerably longer periods of treatment than the remainder. Payroll arranged a series of 26 patients with similar fractures. He concluded that patients arriving for rehabilitation in the first three post-plate weeks required their agility and general fit more rapidly than those arriving after the third post-plate work, thus confirming the larger Service-based studies.

A pilot study<sup>3</sup> was carried out in the rehabilitation department at RNR Hatter in 1970 with the co-operation of the orthopaedic department. It was designed to show that intensive rehabilitation could return Service patients to full duty in a significantly shorter period than was being achieved at that time. A total of 39 post-operative non-emergency patients were studied and the criteria for entry to the trial were that the patient could stand up by rails with control, an operation wound was clean and there was

no joint stiffness present. Patients were randomly allocated to one of three randomized treatment groups at the time of operation but concerned the appropriate schedule approximately one day after operation when the criteria for entry were fulfilled.

Group 1 were transferred to intensive full time rehabilitation. Group 2 were discharged to a hospital of convalescent leave, which was followed by a standard outpatient rehabilitation programme. Group 3 were also discharged to a day work convalescent period but in those cases this was followed by the same programme as Group 1.

Patients in Group 1 (Fig. 1) achieved full recovery at a mean interval 86 days. It can be seen that there was a wide scatter in recovery times. Group 2 patients achieved full recovery at a mean time of 44 days. Group 3 reached fitness in the working shorter time of 38 days with only 3 patients taking longer than 55 days to fully recover.

While the results stated were small the results influenced the introduction of

early intensive physiotherapy in the post-operative management of a significant proportion of orthopaedic patients. It clearly is a strong case for having temporary accommodation in the hospital for patients receiving full time rehabilitation.

#### Conclusion

On the strength of the evidence so far available the case is made for early active rehabilitation programmes in order to reduce the duration of disability and influence the magnitude of prolonged disability. It is believed that consideration should be given to establishing limited rehabilitation centres in the three main Commands, namely Portsmouth, Plymouth and Scotland. These should have accommodation beds established within the framework of medical time, physiotherapy and medical ground services so that patients could be shifted to one of these centres immediately after definitive treatment. This would be akin to the abolition of convalescent camps which would be replaced by full time attendance for rehabilitation at an early stage after operation.

#### Acknowledgements

I should like to thank Surgeon Commanders I. M. Berlin RN Professor of Naval Medicine and Surgeon Commander D. M. Cross RN Senior Specialist in Biochemistry and Rehabilitation for their help in the preparation of this paper. I am grateful to Mr C. Light for the graphs, work and to Mr C. Dean for the photography.

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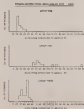


Fig. 1

# Short Reports and Summaries

The following papers are to be read

## Combined Casualty Care

Reporters: Captain J. W. Richardson, MD, MC, USAF, USAF  
 and  
 Reporters: Captain J. W. Richardson, MD, MC, USAF, USAF

The current combat casualties, both in number and quality, represent a new and different type of casualty. The current combat casualties are more numerous and more varied in nature than the casualties of the past.

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 and  
 Reporters: Captain J. W. Richardson, MD, MC, USAF, USAF

The current combat casualties, both in number and quality, represent a new and different type of casualty. The current combat casualties are more numerous and more varied in nature than the casualties of the past.

## Woodbury Composite Book

Reporters: Captain J. W. Richardson, MD, MC, USAF, USAF  
 and  
 Reporters: Captain J. W. Richardson, MD, MC, USAF, USAF

The current combat casualties, both in number and quality, represent a new and different type of casualty. The current combat casualties are more numerous and more varied in nature than the casualties of the past.

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RRPS have a low smoking prevalence, samples and cases that are in fact, little better of a more polluted group. One such group, recently examined, comprised life saved merchant seafaring seamen in Chatham, Devonport and Plymouth. These were likely to represent a general group of former military seamen, given their experience and although the results of a sampling returned negative to recent levels of asbestos pollution, it was decided to use the RRPS which have already to establish the presence or very low rates of hazard from such work. The results of the examination were provided in detail and the necessary steps of data request upon the authors and their advice and policy recommendations is awaited.

### **Damage to the Lung by Fine Smoke**

*Immunotoxicology* D. M. Smith FRCPsK

Two papers describe a long term or potential working in ship compartments, in ship, land and tanks and an overall risk of developing lung disease from the smoke inhalation in the past 40 years. A particular study from a general medical centre that related to the asbestos (Cancer group) with asbestos as a risk to the lungs (lung) through smoke.

The smoke inhalation is caused by high velocity in and outboard smoke and therefore a number of problems arise in that there is no fire burning or if the smoke is long term, with both a variety of smoke such as cigarette, cigarettes of various types and for machines.

The authors however, state as usual that smoke inhalation causes the occurrence of lung disease. The authors of the paper presented on smoking of tobacco were particularly in comparison with the Chatham Devonport Plymouth (Chatham and the Chatham Devonport Plymouth) study. In the study, an animal study is described, the two authors described as in this is the smoke inhalation as long term by smoke and with smoke in comparison. The effect of smoke from of smoke (smoke) in the study was reported to be an increase of smoke (smoke) in the study and from a description of the study and a study with the test and the test of smoke of smoke and a study of smoke. Consequently, significant is smoke (smoke) when compared with smoke that they report to smoke (smoke) damage in the study.

The authors state in this field to study (smoke) smoke (smoke) the authors also have a study of smoke (smoke) smoke (smoke) smoke (smoke).

### **Immunology Studies**

*Immunotoxicology* D. M. Smith FRCPsK  
*Immunotoxicology* D. M. Smith FRCPsK

It is hoped to review the present state of the study.

### **ERRATUM**

**Horvath J. R., Smith D. J. Hazards of  
Endless Space — Endless Ambulance CO<sub>2</sub> /  
by air medical service 1989 67(3) 135-145**

Due to a scaling error the y axis of the plot of chamber ventilation in fig 2 (p. 140) is mislabelled. The range should be 4 to 80 L/min giving mean period values of 7.4, 9.2 and 7.4. The relative changes are the same as those used for text as accurate.

## Uncomplicated Eustachian Tube Dysfunction: The Site of the Nasal Septal Deformity

W. D. Marshall

### Abstract

*Eustachian tubes were subjected to the following: (1) Dry and (2) Wet, then the stem (nasal) and bulb (middle ear) were subjected to an experimental Eustachian tube dysfunction syndrome (obstruction) which involved creating ear negative Eustachian function using an FDA catheter tip of the tube. Results for wet or ventilation tube had positive. Results for dry function impairment or injury, and for a control group and syndrome did cause a disruption in the ear middle group. All the information pertaining to group that is the result of isolated Eustachian tube dysfunction. This dysfunction was caused by dryness of the subject in the middle ear system, possibly not involving the middle ear system. When the subjects with Eustachian tube dysfunction were able to breathe their middle ear pressure in the Eustachian tube.*

*All 100 subjects were found to have a small nasal airway (nasal) in the presence that of the middle ear system in the middle of the middle ear system. All the subjects had normal Eustachian function of the middle ear system. This finding indicates that the middle ear system, and the middle ear system and middle ear system of the middle ear system. All 100% of subjects were able to breathe their middle ear pressure in the middle ear system and the middle ear system in the middle ear system of the middle ear system.*

### Introduction

Eustachian tube dysfunction contributes to the development and maintenance of middle ear disorders of the chronic middle ear system.<sup>1,2,3</sup> Various factors may affect the normal function of the Eustachian tube.

1. Hydrated pressure of the middle ear system in the tube and peritubal system.
2. Obstruction of the tube orifice by an hypertrophied pad of mucosa or by tumor.
3. Obstruction of the tube orifice and tumor due to inflammation or infection of the tube process due to either an

infectious or allergic cause.

4. Failure of the functional mechanism of the tube system or complete drainage.
5. The integrity of the system middle ear in the Eustachian tube.

### Myoelastic Mechanism

The myoelastic mechanism which moves the Eustachian tube begins from the tympanic end of the tube towards the nasopharyngeal end of the tube when the tube opens.<sup>4</sup> When the Eustachian tube closes the closure starts at the nasopharyngeal end.<sup>5</sup> The myoelastic mechanism consists of two layers: an outer elastic layer which acts as an inner skin layer of the middle ear, which facilitates the movement of the tube. The ends of the tube are in contact with the overlying film of mucus and movement of the tube causes the movement of the mucus. Various factors may influence this activity: adequate ventilation is essential for the maintenance of the integrity and normal function of the tube.

Increased drying of the middle ear system causes erosion of the middle ear system. Drying may occur due to several factors, and drying for a few minutes leads to destruction of the tube.<sup>6</sup> Excessive drying may occur due to:

1. Prolonged breathing of extremely dry air.
2. Inadequate warming by the middle ear.
3. Decrease of the middle ear system by upper respiratory infection or polyp.

The decreased respiratory resistance is concentrated on a restricted area of mucosa, the provision being in excess of the local capacity to warm the air. Excessive local vasodilation results leading to greatly increased vascularity of the nasal mucosa (16).

For efficient olfactory action a flow of mucus of variable viscosity is essential. Thus local areas of the mucosa thicken and the creation of sticky mucus results (17).

#### Nasal Airflow

The nasal airflow in the common nostril of the nose is in the form of an arc which goes up, back and down (18). Topper and Kanner (19) demonstrated that the airflow in the nose passes mainly through the middle portion of the common nostril. The airflow within the nose is turbulent as the air passes through the narrow passages and over irregularities such as the turbinates and septal ridges (20).

#### Aims of the Investigation

To demonstrate by PA radiography of the skull the site of the nasal septal deformity in these subjects who are suffering from an unoperated Eustachian tube dysfunction.

#### Method

Eighty-two serving members of the Royal Navy were surveyed. All the subjects were consent volunteers to their chosen specialisation. Each subject was found to have an unoperated Eustachian tube dysfunction. The findings are given in Table 1.

Twenty-five candidates to the Fleet Air Arm who were found to have tympanic membrane mobility on otoscopy when the Valsalva and Toynbee manoeuvres were performed, acted as a control group.

#### Methods

Each volunteer had a full otoscopy and a radiograph was placed on roent and post radiograph and rhinological history. The results are shown in Table 2. Each

**Table 1**  
Ventilation of subjects assessed with incidence of middle ear dysfunction

	Control	Unoperated	Operated
Normal	10	10	10
Unilateral	0	10	10
Bilateral	0	10	10

**Table 2**  
Rhinological rhinological history

	Control	Unoperated	Operated
Normal	10	10	10
Unilateral	0	10	10
Bilateral	0	10	10

subject underwent pure tone audiometry, tympanometry, Eustachian function testing, PA radiography of the skull and exposure to an increase in ambient pressure at their centre of entry in the comparison chamber at HMS Dolphin. Those that failed to equigulate their middle ear pressures were returned to operations.

The middle ear analysis and Eustachian function testing was performed using a Grant Stiller 173 Middle Ear Analyser.

#### Postoperative Findings

1. Subjects who had unoperated Eustachian tube dysfunction and 22 subjects had a unilateral dysfunction.
2. The auditory scores of all the candidates were found to be between 0-20 dB between 250 Hz and 8 kHz related to the ISO standard (1964).
3. Middle ear analysis in the unoperated group revealed that 80 subjects (80%) had middle ear pressure that fell between -30 mm and +30 mm of water.
4. Eustachian function testing confirmed the presence of a Eustachian tube dysfunction in those ears in which the tympanic membranes had been found to be immobile on otoscopy when the



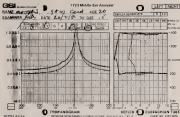


Fig 1. Expiratory function curves of a subject with bilateral Emphysema rate dysfunction. The homogeneous desaturation is evident within the pressure, while Emphysema function testing on the right of the figure shows the absence of an upward deflection in the pressure, demonstrating performance of the Volume measurement.

Volume and Tidal Volume measurements were performed. Fig 1 demonstrates the Expiratory function test of a subject with bilateral Emphysema rate dysfunction. There is no upward deflection on the pressure pressure curve on performance of the Volume measurement. Fig 2 demonstrates the Expiratory function curves obtained in a subject with unilateral Emphysema rate dysfunction. One test is able to test an induced positive pressure and therefore has normal Expiratory rate function while the opposite test demonstrates an upward deflection of the pressure pressure curve on performance of the Volume measurement.

- There was one demonstrated about Expiratory rate function on Expiratory function testing measured a mild or a moderate when the effects

subjects were exposed to an increase in ambient pressure not exceeding their means of water. The results are shown in Table 2.

Table 2

Results of tidal measurement of Expiratory function, stability and response to an increase in ambient pressure (normal)

Subject	Normal	Deflated
1	1.0	1.0
2	1.0	1.0
3	1.0	1.0
4	1.0	1.0
5	1.0	1.0
6	1.0	1.0
7	1.0	1.0
8	1.0	1.0
9	1.0	1.0
10	1.0	1.0
11	1.0	1.0
12	1.0	1.0
13	1.0	1.0
14	1.0	1.0
15	1.0	1.0
16	1.0	1.0
17	1.0	1.0
18	1.0	1.0
19	1.0	1.0
20	1.0	1.0
21	1.0	1.0
22	1.0	1.0
23	1.0	1.0
24	1.0	1.0
25	1.0	1.0
26	1.0	1.0
27	1.0	1.0
28	1.0	1.0
29	1.0	1.0
30	1.0	1.0
31	1.0	1.0
32	1.0	1.0
33	1.0	1.0
34	1.0	1.0
35	1.0	1.0
36	1.0	1.0
37	1.0	1.0
38	1.0	1.0
39	1.0	1.0
40	1.0	1.0
41	1.0	1.0
42	1.0	1.0
43	1.0	1.0
44	1.0	1.0
45	1.0	1.0
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47	1.0	1.0
48	1.0	1.0
49	1.0	1.0
50	1.0	1.0

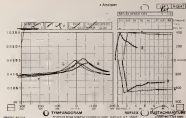


Fig 2 Tympanometry (normal area) of a subject with a unilateral Eustachian tube dysfunction. The tympanogram also measures normal middle ear pressure in both ears. Eustachian function (using the Right of the figure) demonstrates a flat plot (the left ear) and a 'u' shaped deflection on testing the left ear, while the right ear is able to return to normal pressure (pressure decreasing) during pressure at the Eustachian tube.

- 6 Clinical examination of the nose revealed the presence of a bony protrusion (spur) from the hamular (middle third) of the posterior half of the nasal septum, and at the vomer-ethmoid suture. The spur projected into the middle portion of the common meatus. This deformity is obvious on anterior rhinoscopy as long as there is no marked anterior cartilaginous deformity.

- 7 PA radiography of the skull in these subjects suffering from an uncomplicated Eustachian tube dysfunction demonstrated the presence of a bony deformity (spur) at the middle horizontal third of the septum (Fig. 3 and 4 demonstrate the deformity at the middle third of the septum, Fig. 5 is the PA radiography of a subject who had positive Eustachian tube dysfunction. It can be seen that there is no defect in or

deformity (spur) at the middle third of the septum.

#### Post-operative Findings

Six weeks after undergoing a subnasal revision of the nasal septum, each subject was re-examined in middle ear aural Eustachian function testing and exposure to an increase in ambient pressure.

- 1 Eighty three subjects (93.2%) had middle ear pressures between -50mm and +50mm of water.
- 2 Eighty five subjects (85.5%) were able to equalize their middle ear pressures when exposed to an increase in ambient pressure of 40 mmHg of water. The results are comparable to those obtained by McNeill and Scott<sup>10</sup> in their original investigation into the cause of uncomplicated Eustachian tube dysfunction (the nose can correct problems).



Fig. 1 Cephalogram is consistent with the right nasal deviation diagnosis. There is no deviation of the middle third of the nasal septum.



Fig. 3 Cephalogram is consistent with the left nasal deviation diagnosis. There is no deviation of the middle third of the nasal septum.

1. Eighty-two subjects were recruited: four subjects were unable to equalize their middle ear pressure at a depth equivalent to three meters of water. Three of the subjects had a unilateral Eustachian tube dysfunction; two of these subjects had had a previous otosclerosis/stenosis with marked scarring of the lateral ptery and soft palate. There was no obvious scarring of the tone of the Eustachian tubes.
2. Fig. 4 demonstrates the Eustachian function test and middle ear analysis of a subject with bilateral Eustachian tube dysfunction. Fig. 5 demonstrates the Eustachian function test performed six weeks after operation. It can be seen that on performance of the Valsalva maneuver an upward deflection is obtained on the positive pressure curve.

#### Comments

Pre-operatively 81 subjects (83%) had

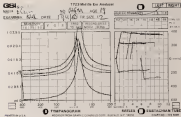


Fig 2. *Normal function but poor oral pressure control.* The tympanogram demonstrates that the middle ear pressure is not 0.05 mbar when the subject is at rest (top). The tympanogram function test on the right by the subject does not show a 'normal' Eustachian tube function.

middle ear pressures that fell within the range -50 mm to +50 mm of water while the woman after operation 85 subjects (94.7%) had middle ear pressures that fell within the normal range. The majority of the subjects assessed therefore theoretically had normal Eustachian function as measured by middle ear pressure levels and auditory acuity tests.

It is postulated that the rising of the nasal septal deformity in the vomer-ethmoidal suture is critical in the production of the nose air drainage syndrome. Because the septal deformity is fixed at the middle third of the septum in an anterior half, this deformity prevents an obstruction to the nasal airflow as it passes close to the septum, mainly through the middle portion of the common nostril of the nose.<sup>1,2,3</sup>

It is suggested that the syndrome is directed towards the nasopharyngeal

orifice of the Eustachian tube, where the mucous blanket is dried thereby making it more translucent<sup>4</sup> than when the Eustachian tube opens, the mucous film cannot split and therefore air cannot enter the middle ear duct so that the middle ear pressure cannot be equalized. For several Eustachian tube is then prevented from equalizing the middle ear pressure when the subject is exposed to an increase in ambient pressure. McLeod and Scudler<sup>5</sup> using Kasser<sup>6</sup> otoscopy demonstrated in subjects with the nose air drainage syndrome that there was marked turbulence of the airflow in the nasopharynx which was abolished after adequate resection of the inferior process and bony nasal septum.

#### Acknowledgements

I should like to thank the staff of the Submarine Escape Tank at HMS Dolphin



# **A Case of Spontaneous Rupture of the Cervical Oesophagus: A Reminder** N. P. Dingley and P. E. Wilson

## **Abstract**

In a 3-day follow-up programme of patients in a post-operative intensive care unit, a case of cervical oesophageal rupture was identified. It is a rare but potentially fatal condition and should be considered in patients with

neck and respiratory distress who have no demonstrable chest x-ray abnormalities. A chest x-ray showed mediastinal emphysema which extended to the supra-diaphragmatic region but no hydro-pneumothorax was identified.

## **Case Report**

A 39-year-old male presented to the Casualty Officer of the Royal Naval Hospital Plymouth two days after a May 1979 completion of vagotomy when central chest pain arose in character resembling the right side of the neck. He was dyspnoeic at rest and his respirations were gasping in character.

Ten to fifteen hours earlier he had eaten a Chinese "take away" after a night's heavy drinking. Following the meal he had vomited. His efforts at regurgitation produced sharp pain both epigastrically and in the neck, this had slowly diminished. He had also been aware of breathlessness and increasing chest pain 35 hours prior to when he was taken back to bed in a semi-recumbent position, this precipitated further acute worsening chest pain. He then persuaded himself to the Accident and Emergency Department.

Examination showed respiratory distress; the patient had a grey face, but was not greatly cyanosed. There was marked emphysema of the right side of the neck, the area being acutely tender to palpation. The pulse was 90/min but blood pressure and temperature were normal. The trachea was central. The chest moved equally; respiration rate was 30/min, and the heart sounds were diminished. Widespread respiratory

## **Investigations**

The admitting medical officer made a diagnosis of spontaneous rupture of the oesophagus. Emergency gastroscopy and barium swallow did not show an oesophageal leak. The situation was discussed with a consultant thoracic surgeon who advised that, as 36 hours had elapsed since the patient's initial symptoms, conservative treatment was the course chosen.

## **Management and Progress**

Bed rest, analgesia, intravenous electrolyte solution with antibiotics given on the basis of microbiologic 500 swabs and penicillin 500 swabs given orally 6 hourly and ampicillin 500 mgms IV also administered 6 hourly over the regimen. No



Fig. 1. Mediastinal emphysema seen on chest x-ray.

absence of passage of a nasogastric tube was made. During the next five days the patient's surgical symptoms resolved. She died a day or so later showed evidence of pleural fluid on lung examination. A "Chalard" tube was passed and initial dilatation was continued for five days. Subsequent resolution of solid diet was attempted. The patient left hospital for convalescence symptoms less 20 days after the initial symptoms. Follow-up radiograph and esophageal examination failed to show any abnormality in the esophagus.

### Discussion

#### Aetiology

Spontaneous rupture of the esophagus has been reported in almost any condition which causes a sudden increase in the intra-esophageal pressure. Thus it has been encountered in hyperemesis gravidarum, prolonged labour, epistaxis, violent defecation, heavy lifting and sneezing.<sup>1,2</sup>

#### Predisposing factors

**Anatomical** The lower third of the esophagus has predominantly mediastinal musculature; it is thinner and has been noted to have segmental defects suggesting incomplete development.<sup>3</sup> Additionally the lower third is buttressed by pleura above on the left.

**Pathophysiology** The pressure found necessary to rupture a cadaver esophagus was 4.6 lb./sq. in was also noted that tears first occurred at the level of the upper oes. Talamo and Jaffe<sup>4</sup> suggested that there must be pressure outflow for rupture to occur. Wahl<sup>5</sup> suggests that a possible factor in lower third rupture is per-meating hernia hiatus. The noted intra-abdominal pressure produced by vomiting caused mucosal laceration linking the proximal esophagus thus obstructing normal and pericapsular rupture.

#### Clinical features

Spontaneous rupture of the esophagus is

commonest but spontaneous rupture of rupture of the esophagus is rare.<sup>1,2</sup> Spontaneous lacerations of the intra-abdominal esophagus is also a great rarity.<sup>6</sup> Esophageal rupture of a truly spontaneous nature with no history of external trauma or instrumentation tends to occur over the whole age spectrum but is usually seen in the 30-50 age group. Vomiting, hot foods, more commonly in males, than females.<sup>7</sup> (Figs 1 and 2).

The classical features consist of severe pain in the chest radiating through to the back and with lower esophageal rupture into the pleural cavity with rigidity and guarding.<sup>8</sup> In oesophageal rupture there is pain over the anterior triangle of the neck. The patient classically presents first at night following ingestion of a large amount of alcohol or a large meal. There is usually a history of vomiting which always precedes the pain and is subsequently accompanied by the appearance of surgical emphysema. The



Fig. 1. Management.



Fig. 2. Management.

## Spontaneous Intraperitoneal Rupture of Pterospheroids R. B. Lefebvre

### Abstract

*Intraperitoneal rupture of a pterospheroid is an extremely rare form of spontaneous abortion. The focus of this letter is a child, aged 10 yr, who had an operation for pyruvate dehydrogenase deficiency. The case described is added to the 12 previously reported.*

### Case Report

A 10-year-old female was admitted with a 48-hr history of severe colicky right upper quadrant pain radiating to the epigastrium and right chest base. She admitted to similar less severe pain over the previous three months, which appeared to be associated with the ingestion of fatty foods. She denied any recent urinary symptoms, but nine years previously she had been investigated for urethral discharge following the passage of a cystolith.

Physical examination revealed a toxic-appearing lady with a pulse of 98/EC and tachycardia of 102/min. Her abdomen was distended and tympanic with a few isolated bowel sounds. There was marked tenderness, with guarding and rebound throughout the right side of the abdomen and rectal examination revealed tenderness high on the right side. Routine investigations were as follows:

Haemoglobin 12.1 g/dl

White cell count 7,000/mm<sup>3</sup>

Blood urea 7.3 mmol/L

Creatinine 0.2 mmol/L

A plain radiograph of the abdomen (Fig. 1) revealed several small bowel fluid levels associated with an ileus secondary to peritonitis. No other diagnostic features were noted.

A diagnosis of perforation of an intraperitoneal cyst was made and laparotomy performed. At operation a large volume of peritoneal exudate was present, collected mainly in Rutherford Blom's crotch extending down the right para-aortic gutter. The dissection was covered with fibrous strands and at first sight appeared to be the site of the perforation. However, on closer scrutiny this was found to be normal, but there was an 0.5-cm perforation in the posterior peritoneum underlying the upper pole of the right kidney. Extent of the perforation and digital exploration was that a large abscess cavity



Fig. 1 Plain film radiograph of the abdomen showing fluid levels.





clinical picture develops with depression and collapse. In the late presentation there is profound shock, tachycardia and if the pleura has been breached the classical signs of hydropneumothorax (Fig. 4 and 5).

Voicing is a usual feature. However, spontaneous pneumothorax rupture has been reported in a patient at rest.<sup>1</sup>

#### *Delayed diagnosis*

Oesophageal rupture can cause the following conditions:

- Perforated peptic ulcer
- Myocardial infarction
- Spontaneous pneumothorax
- Acute pancreatitis
- Dissecting aortic aneurysm

The most important factor in making a diagnosis of oesophageal rupture is a high index of suspicion on the part of the attending physician.

#### *Investigation*

In acute oesophageal ruptures a V sign may be seen where an elevated pleura rises from the mediastinum and the left basal part of the diaphragm.<sup>23</sup> The chest x-ray in this case shows classical mediastinal emphysema with upper diaphragmatic subpleural pneumothorax but no V sign. A swallow with gastrograffin or dilute barium suspension may be used to delineate the site of leak. In this case the barium and gastrograffin swallow was negative. It has been suggested that passing a nasogastric tube and instilling 10-12 ml of iodized oil whilst the tube is withdrawn yields a higher pick up of leaks.<sup>24</sup> This technique was not attempted on view of the patient's stable condition and the possibility of causing further damage by passing a nasogastric tube.

#### *Treatment*

Cervical rupture can occur with an iatrogenic ulcer or with associated signs of



Figure 4 - Medial view of oesophagome and right chest (hydropneumothorax) in ruptured lower third of the oesophagus

food and digestive juices into the tissues of the neck. The latter needs to reflect in and obscure formation. The treatment is prompt surgical exploration and ligation with closure of the cervical oesophagus at the point of rupture using a non-absorbable suture.

In thoracic perforation drainage of the mediastinum and closure of the tear is carried out when the oesophagus is not excessively trouble. A feeding gastrostomy or

prophylaxis may be performed. Some theories suggest release an aggressive approach to patients with mechanical injury following perforation involving oesophageal injury and later reconstruction with a stomach-jejunum.<sup>12</sup>

More recently it has been proposed that late rupture with a poor prognosis should be managed in a less aggressive manner: the oesophagus being placed on pleural drainage and full expansion of the lung under cover of antibiotics, the incision wound now being covered with 20% sodium hydroxide applied as an oesophagostomy.<sup>13</sup> The development of minimally invasive laparoscopic and endoscopic data have greatly enhanced prospects of recovery in this group of patients.

### Prognosis

The prognosis of oesophageal rupture of the chest is considerably better than that of non-thoracic rupture. However, the mortality of 20% recorded by Hinton<sup>14</sup> following mediastinal perforation of the cervical oesophagus throws some doubt on the inherent expansion of attitude adopted with this site of injury.

Thoracic rupture still has a worse prognosis despite advances in management for disease recovery the development of antibiotics and intensive care support which have reduced the mortality of this condition. Early diagnosis and surgical management in the first 12 hours has a 30% mortality. At 18 hours there is a reported nearly 60% mortality but when presentation is 24 hours, there is an exceptionally high mortality over 80%.

### Summary

In the rare reported oesophageal rupture clinical variables recorded during the initial warning episode. A second look 24 hours later after degradation of leaks preoperated the presentation. He was seen by a medical officer who recognized the significance of chest pain, supra diaphragm, surgical emphysema and the acute appearance of mediastinal emphysema. Conservative treatment resulted in a complete recovery.

The early recognition of spontaneous oesophageal rupture is an absolute prerequisite of subsequent treatment to be considered by the mortality and morbidity.

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patient signed laparotomy is indicated. Simple drainage of the abdomen and abscess cavity allows recovery and subsequent full urological investigation. Should further surgery be indicated, then the best approach to the kidney system is recommended, allowing easier access.

### Conclusions

Intercapsular rupture of a pyramphren is an extremely rare condition. The diagnosis is usually made at laparotomy for peritonitis, renal scars being recognized. The recommended treatment is simple drainage followed by full urological investigation and further elective surgery where indicated.

### Acknowledgement

I am grateful to Surgeon Captain I. M. Richardson QMC, FRCS, Professor of Naval Surgery, for his permission to report this case and to the other two cases.

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# Unusual Movements of a Normal Tongue J. T. Holland

Unusual movements of a tongue were observed when the patient, a 26-year-old male, was being fitted with new full dentures after a dental clearance. When asked to put the tip of his tongue to the back of his palate so that contact occlusion could be recorded, he responded by dipping his tongue upwards and backwards as that it disappeared into his nasopharynx behind his rather long soft palate. He could repeat this movement at will and was surprised that it was observed when he had been able to do it for as long as he could remember.

The tongue was of normal size and

appearance but the insertion was completely absent, making the considerable backward movement although protrusion was not abnormally great. The nasopharynx and posterior nasal space could be probed as far laterally as the sphenoid space and he was able to describe various protrusions such as the inferior turbinate and the middle nasal concha. None of these tongue movements triggered a gagging reflex.

The patient himself was of an anxious and inquiring nature, rather neurotic, anxious to know the technical details of his



Fig. 1. Tongue disappearing upwards.



Fig. 2. Tongue disappearing laterally behind palate.



Fig. 1. A patient with a dilated sub-palate pushing past the nasolabial groove.

treatment which had been prolonged and complicated. He was a chronic smoker and was undergoing long term steroid treatment for carcinoma. On top of this he had back pain despite a laminectomy some years previously which limited his ability to work. His own explanation of the tongue

habit was related to a tubercular infection at the age of ten. Some hard skin, given his trauma at the tubercular region, which he could not deal with his tongue. However it is possible that he was able to do this because of the increased mobility of his tongue rather than that mobility was acquired because of the habit.

A similar case was reported by Fisher<sup>1</sup> but he considered the habit to be acquired. The patient described found he could clean the back of his nose with his tongue and bring functions and clearance in his personal hygiene. He thought this beneficial when he suffered from chronic nasal congestion and sinusitis and nose bleeds.

The phenomenon is unusual and a little alarming when first seen. It is surprising that only one instance of it has occurred in the literature. This may be due either to its rarity or that it is unobserved and unrecognized by doctors and dentists concerned with oral examination. The underlying abnormalities are the mobile tongue, lack of a frenulum and a long, dependent sub-palate the combination of which make these movements possible.

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## Where the Other Apples Grow\*

By P. Gerd

The journey from Paddington to Broad in June 1942 was extremely pleasant. It was a delight to leave the green fields of England again, with the trees in full leaf and a general atmosphere of peace and tranquility which belied the terrible state in which our nation then stood, menaced by a powerful enemy and historic getting the work of most men. We had never lost our faith in ultimate victory, of course. I cannot now understand why we did not do so long the spirit of the country was splendid and despite the war and the anxiety, England was indeed a wonderful place in which to live.

The Royal Naval Auxiliary Hospital at Barrow Canyon was housed in a complex of buildings originally intended for use as a treatment center for psychopaths. It was situated in a very lovely part of the countryside, surrounded by green fields and tall trees—the only disadvantage being that because of the distance between the buildings, it required a limousine to get from one part to another. This was an excellent source of physical exercise but at times a couple of minutes that could have been better used in other ways.

Walking for the first time at the entrance of the hospital I was rather puzzled to see a tall, thin Sergeant Commander RMYR, emerge from a minor door. His cap was arranged with the peak very much to one side and with his walking he was wearing a pair of light and handsome slippers. He told

me, smilingly, curved slightly, a crook in his front, while with the other he uttered the most charming personality he told me it was. I was glad to make my acquaintance and wondered if it would be hard enough to sample the perfume emitted by this particular rose. I promptly did so, whereupon he asked me whether I thought the perfume was much? I did not know exactly what words to use but I assured him that it was very much indeed. He seemed highly gratified by this and told me that this genre of rose did not usually have this perfume at all. He was so it turned out the Senior Psychiatrician to the hospital and resented in that branch of the profession. I got to know him very well and found him the gentle charming being extremely well educated and with a delightfully sympathetic manner. His work on evening lecture rounds and entering distressed personalities was most interesting and in his way he did a vast amount for the betterment of the war effort. Many officers came into the hospital having been subjected to severe emotional strains or to long periods of intense physical danger and following treatment by the psychiatricians they frequently left almost as good as new.

The medical staff of the establishment was largely drawn from the RMYR. In fact I do believe that I was the only nurse to visit Royal Navy medical officers in this place. The Surgeon Rear Admiral had been covered by my company and had, in fact, been my first Medical Officer in Charge when I was in Malta. When I arrived and reported to him

\*The "pink psychosis" of Admiral Gerd's reminiscences, 1942-1943.

one day he told me that Barron Gurney was largely a recurrent establishment and I should not expect to find the discipline or attention to regulations to which I was accustomed. However, I was on an island to assist the members of the RNVR. The Surgeon Captain RNVR in charge of the medical division was drafted shortly after my arrival and replaced by a young naval aviator, Royal Naval officer. This Surgeon Captain was very keen on the standards of his working staff and those that not only for their ability but also for their politeness. When one visited the medical block it was quite striking to note the high standard of beauty amongst the nurses and medical staff. When one visited the mess hall block it was quite striking to note the high standard of beauty amongst the nurses and medical staff. When one visited the mess hall block it was quite striking to note the high standard of beauty amongst the nurses and medical staff.

The sick berth staff was largely drawn from retired regular members of the medical profession but there were also considerable numbers who had been members of the RN Auxiliary Sick Berth Service. As far as I could determine membership of this particular reserve branch was available to persons having a knowledge of first aid who had recently completed a fortnight's course at one of the large naval hospitals. One of them was a Petty Officer who was also very important amongst the personnel in the north of England. I liked him very much and one day when I met him on the grounds he told me of his great interest in one of his brother Petty Officers, who he said had killed him and murdered him on several occasions. He asked me what would be likely to happen were he to find his temper and strike this person. I looked at him for a moment and asked him if he had ever read the text in the Gospels which reads: Agree with thine adversary quickly when thou art on the way with him. He left me and a short time later returned but again smiling broadly and full of good humour. I asked him what had happened during the interval and he replied: You did not agree me with

the rest of the text. So I looked it up and found that after having been advised to agree with one's adversary quickly the next words were: but for being just before the witness and the effort being put before the judge and so on and so on.

There was in the hospital a school for the instruction of newly joined candidates for the sick berth staff. It was rather good for in those days a concept considered unfit for any form of responsibility, naval service could be developed into becoming either a cook or a member of the sick berth staff. The school was run by a very efficient and extremely smart young Warrant Ward master. Shortly after my arrival I was appointed to be the final examiner in partnership with the senior pathologist. One criterion for satisfactory performance in the final examination was that the candidate should show himself capable of being the only medical assistant in a newly joined medical officer on a small ship. If he did not measure up to this standard he was not likely to be accepted. Unfortunately the subjects of other naval hospitals were not as rigorous in their requirements and we got into a certain amount of trouble. Afterward finding that when a young sick berth candidate was known to be efficient it was frequently said:

Of course he's a Barron Gurney boy. This particular trial was a guarantee that the man was worthy of some confidence. It is a disturbing thought that the sick berth staff was never given the ground and trust to which it was justly entitled. This was a tradition of parsimony when the Cooks and Medical Branch were not infrequently given the bottom of the barrel. One or two incidents occurred which drew home to the small contribution the great responsibility borne by a sick berth rating in a ship without a medical officer, but it took the death of one individual and the press reports which followed to make them look more deeply into this problem. I have often thought that were I compelled to make a



long and arduous journey across an unknown country and to give the chance of a companion, he would undoubtedly be a party officer, credit to Michael Broude.

The Royal Air Force was interested looking to money for planes and equipment at this time and throughout the country various functions were held in aid of what was called: Money for Victory. At Barton Cemetery we had our own fair where, in addition to Joe Lee and his arduous, had many stalls and other attractions for the acquisition of money. One of these comprised a hoop to display, the idea being to encircle a box with a hoop, whatever the encircled prize became one's personal property. A pound note was quite a desirable item on those days and a colleague, and I naturally a pound note held down on a box to such a position that it seemed it would be extremely easy to encircle it by a judiciously thrown hoop. We mentioned this to the young man in charge of the stall who agreed to let us try our luck. After a few attempts it became obvious that it was pretty well impossible to achieve, the reason, he pointed out, that adjustment of the legs of the supporting table made it extremely unlikely that the hoop would ever fall squarely encircle the pound note. I made enquiries about this well spoken young man and came to the conclusion that for his experience was now working out to our advantage!

Once or twice a week a large number of patients would be admitted to Barton Cemetery from other hospitals, many of whom required psychiatric treatment. It was my duty when medical officers of the day to allocate these patients to appropriate wards according to the severity disclosed in work work which had been done on the windows and record of personalities. On one occasion shortly after having completed my admissions, the party officer of the evening then came to see me and told me that the perception on a patient's

baggage did not tally with those on his bed ticket. I stated to me before that the patient's account had allowed himself to be admitted to an insane asylum, and while his patient was now well on his way to Temple Meads Station in Bristol. I telephoned the rail transport officer at Temple Meads. Depending as well as I could the appearance of the patient and the RMO informed me that a man at this destination was standing on the platform, waiting for a London train. He told me that he would allow the would be passenger to alight the train before approaching him. This he did and in a short time the patient was exchanged for the doctor who was allowed to proceed back to the hospital from which he had come. As a result of this, I pleaded that my knowledge of psychiatry was insufficient for the adequate caring of these patients.

On one occasion I was asked to see a young man who had been admitted from the railway station with a slight laceration affecting one eye. He was immediately entered on mental conditions with epilepsy and gave his next of kin as someone of late and commoner. His story was that he had looked out of the window of his railway carriage when a spark from the engine had struck him on the eye and the injury was comparable with that it happened the next day he had to give some further particulars and on this occasion gave as his next of kin someone of late and commoner, but not the same person that he had given the day before. As a result of this and other of his statements I became suspicious and referred him to the Consultant Psychiatrist who seemed to consider the young man to be somewhat unbalanced and irresponsible. After further enquiries I found that the police were anxious to increase the rating and it finally turned out that he was not on the Navy at all. He had not a diagnosis on the train and his appropriate son or money had told his

Indian clothing to the doctor and demanded the usual medicine. He was kept in a psychiatric ward in the hospital and closely watched. He was allowed some exercise in company, with an escort and in winter wore hospital clothing. A couple of months later I was asked to go to the ward where I found the young man silently clothed in a very well fitting Royal Air Force uniform. How they did this I do not know to this day.

When on duty I was always keen on the proper performance of my rounds. There was no point in doing a large and prolonged tour of the hospital and being content to be told by the nursing in the door of the ward that everything was peaceful and normal. I tried to hear the ward and patients and ask questions about the patients. This was particularly important at Barrow Gurney because the hospital was crowded only by a few French and there was no difficulty whatsoever in hearing and understanding the local hospital which was but a short walk across a couple of fields. I was not that if I did my night rounds in an emergency I sometimes would find that half the patients were not in their beds. I soon made a list that I would stagger my rounds and on no occasion during my period at the hospital did I find a space missing on my particular day of duty.

On going to Barrow Gurney one was bound to see someone substantiating to nobody, in reality for a higher qualification and then a large number of the officers proceeded to do. There was a nice academic atmosphere and we had in the main the Professor of Surgery of the University of Wales a very, very surgeon from Liverpool a woman anaesthetist two distinguished physicians and a world-famous specialist in neurology. When working for an examination it was of great value to be able to turn to the man in the next room with a question and receive a really comprehensive answer rather than

have to look up several textbooks and other sources of reference. There were no set courses in those days and little apparent management from the Medical Department to further one's academic career as a candidate, from the King, who had lost interest opportunities for preparation and these were largely worked out by the candidate himself with the resources at his disposal. One of my friends at Barrow Gurney decided to sit for the MRCP (London). He worked very hard in his spare time, visiting hospitals in Oxford as well as the laboratories and museums. Before he left for London to sit the examination I happened to mention to him a book which had been suggested to my five young Polish students with whom I had been working. He said that the first step was to ask the patient in the examination if he had heard what the doctor thought was wrong with him. The second question to be put was "What kind of treatment are they giving you?" and thirdly and most important in the case of one's clinical examination one should ask the patient whether the doctor had covered out any additional examinations which we had not done ourselves. On returning to Barrow Gurney my friend was in no excellent frame of mind. He said that he had thought of me during the examination and when it came to the clinical part he had put the questions to the young lady who was his main clinical case. When asked whether the doctors had done any examinations which he had not covered out she replied that if he placed her in a position halfway between sitting up and lying down he would have a line with the main course in the main area. She explained all the signs of liver disease and when the examiner came along he said to my friend "Now this is a fairly clear cut case isn't it?" and they went over the signs and symptoms of liver disease in great detail. At the conclusion the examiner said "Now did you notice anything else at all about the

present? It certainly is my friend's request, that I should go, and was quite reasonable and could bear a pleasant murmur in the initial area. The treatment was delightful and the Royal College of Physicians of London was proud to accept a new member.

About this time I went to London to complete the examinations for the Diploma in Ophthalmic Medicine and Surgery. One had to take the time from one's normal hours and at intervals there were no opportunities to be taken for relaxation. During the examination I was given a patient as my subject: that is, a boy of about 15 years of age with a leucoplakia. After looking at him, I took him into the dark room for further scrutiny but found that he resisted and suggested to me that it was almost impossible to do anything with him. Obviously, I had misread or had given him half a crown, whereupon his manner completely changed and he became most amenable. I had heard of this sort of thing before but didn't realize that I was likely to be confronted with it. At the conclusion of the examination, a period of about three days elapses before the results are received from the Examination Board at Queen's Square. When I was given the news that I had obtained the Diploma, I was euphoric enough to ring up the Surgeon-Superintendent so that he should be the first to know. My reception was rather less than exhilarating for he said: "Well, I suppose it ought to congratulate you but I hope you'll be back here for duty at 9 o'clock on Monday morning." Shortly after this we got a new Surgeon-Superintendent who had just been promoted. He was an old friend of mine from Haggerston where he had been a senior Surgeon-Commander. I had always liked him and was delighted when he came to Barnes Cemetery. He told me that his two impressions of the place were that it needed a great deal of rehousing up and he relied on me as a regular officer to help him do something about it. Thus I promised to do

but my enthusiasm for the job disappeared when he said that he, being a Major, assumed the duties of Provost, District Officer. Fortunately there was in the hospital at that time a leading orthopaedic consultant from the Irish Royal Irish Fusiliers, whose previous occupation had been connected with prison defence and who had an exceptionally fine knowledge of all ramifications of that subject. Usually our headquarters consisted of a room in a dark rooming-schoolhouse factory building and with open beams. From time to time my general design would approach me and mention a number of things which we needed. He would then let there be an appropriate demand upon which I would sign. It did not consistently occur to me that we could be acquiring a considerable quantity of stores but it was only when my chief was ill, that I entered a large room which appeared to contain every conceivable form of prison defence and prison apparatus. I told the Surgeon-Commander who was relieving me that I could not possibly work with him for the same in all these areas and would be by no way good as to go through them with the Chief. He agreed to do so and we took from several hours but at the conclusion he said that he had never attended such a multiplicity of stores and that there was not even a machine in it.

I went to several courses on prison defence both small and otherwise and acquired a rudimentary knowledge of the medical aspects of chemical warfare as well as the techniques of rescue from outlying buildings and other aspects which a Provost, District Officer is supposed to know. One course held at Haggerston was particularly interesting and one day I arrived to find myself in a room with a number of people who had not previously appeared on the course and who were completely strangers to me. They all wore dark suits and black hats and had highly polished boots and wearing

that the major under discussion that morning was the disposal of the dead. I outlined that the whaling group were the intermediaries of England.

We had never had an air attack upon the hospital or indeed days had since it. We had our own prison area which always seemed as usual as all other a considerable period after it had rung out in other areas and establishments. This gave rise to the remark: "From times in Liverpool that Britain Germany's still at war."

Eventually I heard that I was being posted to Antwerp to help sort a naval auxiliary hospital in Belgium. Before leaving I visited my mother in Belfast and had post arrived in the house when I received a telephone call from my wife in the effect that I was urgently required to Bristol as my time for departure was short. She then read to me a message which she had received from the local Post Office and which, as far as I remember, gave fairly clear details of the date and post of departure of the shipyard. I was in pain. This little confusion together with the fact that an officer on the train to Liverpool was faced in these details with some confusion made me feel that perhaps our movements were not as pre-arranged as they might have been.

After spending only a few minutes with my mother in Belfast I found that returning to England was not just as easy as all that. Eventually through the good offices of the Navy I managed to get a seat on a tiny old aircraft flying to Spize in Liverpool. Flying was of course a comparatively rare experience in those days. Near Barmby, Germany there was an RAF station called Luftwaffe Bremen, we were very friendly with the officers there and the Medical Officer sent me many presents. They had told me that they would be happy to fly me at short notice to any point in Great Britain. Unfortunately this did not include Northern Ireland but I rang Luftwaffe Bremen and asked them to send a

plane and was promised that they would then state that I had immediately requirements in the control tower at Spize when one of the officers said "Your plane is just coming in now sir". I boarded the plane, an Oxford trainer which had a pilot and one passenger who took her flight from the aeroplane and rode briskly from the tower. The pilot asked me to get into his seat and showed me certain controls which I had to operate while he to my the propeller and the engine the engine started and so on. I felt great anxiety but the plane should start to move before the pilot required his seat.

We flew off on 1 September at 10.00 on extremely dark and cloudy day and how wonderful it was to get above the clouds into the sunshine. Our emergency exit seemed to be of a fairly promising nature. We did have a companion and the pilot landed me a short distance in a field with a flag of Great Britain on which he had drawn one way with a point. From time to time he went down below the clouds to get his bearings and I was very happy when he pointed out the city of Cardiff. We then turned left for home and reached Luftwaffe Bremen as time for me to be driven home for tea. The operation had not been without a strange amount of risk for at that time, the Germans were operating over the English Channel and Southern England on a rather menacing way.

I said goodbye to my wife and on month old son and with a party of officers, I stayed and stayed went to Liverpool where we stayed for Liverpool. We travelled to Birmingham where a special train was supposed to be standing by to take us on to Liverpool. Our party was headed by the Professor of Surgery of the University of Wales who was a Surgeon-Captain in the RMVR. He was a very smart officer and carried an old moustache in those days. I went with a silver top. When he got out of the train and asked about the special train which was to take us to Liverpool he carried a certain amount of consideration. The

railway official asked another where the man was whenupon the man replied "What time? What train is going to Liverpool?" In short a train going to Liverpool who had time to? The man then pointed to the Sergeant Captain RMYR and replied "This looks like I did not explain it at the time but these remarks probably mark the beginning of my story.

We duly arrived in Liverpool to join a ship which departed at 11. My wife actually in possession a Canadian Pacific Railway train called the *Empress of Scotland*. We were to sail across the Atlantic Ocean through the Panama Canal across the Pacific to Sydney enroute as quickly as possible and then we proceeded to do. The

ship was dry in that it was forbidden to consume any form of alcohol during the voyage. I remember being in our last berth when talking to a Meridian Service Captain who was a Lieutenant Commander in the RNR. We were reading some Admiralty Fleet Orders, one of which demanded expert officers with special knowledge of the navigational approaches to Antwerp. Another demanded officers with an ability to speak colloquial German. The RMR officer told me that he had spent much of his life sailing in and out of the port of Antwerp, and I replied that I was a German-speaking officer and we laughed as we realized that we were on our way to Australia!

—END—

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# **RN MEDICAL AND DENTAL OFFICERS**

## **RETIRED AND AWARDS**

*New Year Honours 1992*

*Surgeon R. C. Atkinson in the 1847-1851 the British Flag*



*Surgeon R. C. Atkinson, 1847-1851 the British Flag*

*Surgeon Captain R. C. Atkinson OBE, RN, had been Professor of Surgery at the University of Manchester was awarded the OBE for services to the New Year Honours.*

*Commander of the Order of the British Empire*



*Surgeon Lieutenant C. J. Babin, 1847-1851 the British Flag*

*Surgeon Lieutenant C. J. Babin, 1847-1851 the British Flag*

*Surgeon Lieutenant A. J. B. Babin, 1847-1851 the British Flag*

*Surgeon Lieutenant D. Babin, 1847-1851 the British Flag*

*Surgeon Lieutenant D. Babin, 1847-1851 the British Flag*

*Surgeon Lieutenant J. C. Babin, 1847-1851 the British Flag*

## **APPOINTMENTS**

*to Surgeon Rear Admiral C. J. Babin and Embarkation on February 14, 1992*

*Surgeon Rear Admiral C. J. Babin OBE*

*to Surgeon Medical Director General (Health and Director of Medical Services) R. Babin on January 15, 1992, in the rank of Surgeon Lieutenant*

*C. J. Babin, 1847-1851 the British Flag*

## **RETIRED QUALIFYING**

*Surgeon Lieutenant J. C. Babin, 1847-1851 the British Flag*

*Surgeon Lieutenant R. Babin, 1847-1851 the British Flag*

*Surgeon Lieutenant R. Babin, 1847-1851 the British Flag*

## **RETIRED**

*To Surgeon Commander R. Babin, 1847-1851 the British Flag*

*To Surgeon Lieutenant Commander R. Babin, 1847-1851 the British Flag*

*To Surgeon Lieutenant Commander R. Babin, 1847-1851 the British Flag*

*To Surgeon Lieutenant R. Babin, 1847-1851 the British Flag*

*To Surgeon Lieutenant R. Babin, 1847-1851 the British Flag*





Surgeon & Captain Medley (right) Visiting Surgeon J. W. McQuinn CMR, the new 'M' Ward H.Q. at St George's Hospital

## ROYAL NAVAL RESERVE

### RETIRED

Surgeon Commander P. J. Blackmore RD  
 Surgeon Commander M. W. Burgess RCFFRD  
 Surgeon Commander P. W. Buchanan RD RD

## MEDICAL SERVICE OFFICERS

### New Year's Reserves 1992

Chiefs of the Clinics of the British Empire

Commander A. C. Mayhew

Members of the Clinics of the British Empire

Group and Commander D. M. C. Pepp

### PROMOTIONS

To Lieutenant

D. J. Colting

To Acting Sub-Commander

T. M. Evans

## QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

### New Year's Reserves 1992

Surgeons of the Royal Naval Nursing Service

Miss J. P. Moore, Major-General Nurse

### PROMOTIONS

To Superintending Nurse

Miss J. A. Hall, Miss A. M. Day, Miss J. F. Smith, Miss  
 E. Smith

To Senior Nursing Sister

Miss S. M. O'Brien, Miss Y. J. Sharkey, Miss P. A.  
 Rayner, Miss S. McIlroy, Miss S. M. Jones, Miss  
 D. C. Walker

### DEPARTURES

Retiring Sister: Miss E. J. Moore, Miss J. M. O'Brien

### BETHGADRIE PRISON FOR WOMEN 1991

Headed by Head Nurse Susan D. E. Lane of the RN  
 (Head and Staff Nurse) RNM Nurse

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# HMCS BERARD



Just when these vessels after returning from a seven month deployment to the Gulf of Oman the current ship HMCS Berard leaves Portmouthe Harbour to join the Task Force. Like her sister ships, *Pharos* and *Hyacin*, the ship has been converted to a casualty support ship, with accommodations on the main deck and ship's company living hall for 300 severely wounded personnel and space in the main deck for up to 700 walking wounded.

## Editorial

It is only a short time since the Government White Paper (Crest 1982) entitled *The Way Forward* so carefully weighed military and, in one case, medical factors in the economic balance, giving as short measure to the process because quality was not put into the scale, with quantity. Now that the arguments about the need for a training and deployment force for doctors and medical students are no longer than usual for the hospitals and establishments have provided the medical services needed by the Falklands Task Force, we need to rethink our time even more carefully for the next set.

We must be ready to respond to an extension of the argument about medical requirements based on examples or unrepresentative analysis of present events. The costs of the Service will rise but the economic logic will remain the same and the support will still be that part which has no immediate military purpose. The training of the medical services has continued for a decade and a half with no change and no doubt many of you will see this as being in some way unfair because the Medical Director General (Mervin) has kept his expenditure down by real economies and you individually have devised more effective or cheaper ways of doing things to help this. It may be that there are advantages in belonging to the a few Service, but there is no virtue in being an alien, an unreliable Service. While skilled professionals perfect their medical or surgical skills in hospitals the viable part of the Service consists of

Occupational Medical Specialists, a few General Practitioners and those who are not too offended to be called General Duties Medical Officers. Our proportions are not the proportions of the NHS, principally because we do not look after social facilities in the UK. Our half of naval medical officers work outside the hospitals and most of them are in some specialist field of occupational health. The Naval Hospital, the two viable parts, give excellent secondary care to naval personnel who need it but only about half that patients are naval, the rest being civilians.

To develop and keep their skills these hospital specialists need not have busy and fewer civilian patients for a greater number and variety of patients if on an emergency they are to act effectively. The cost of the Naval Medical Service, an estimate put down by the Navy for all our services, is some 2% of the total budget, plus for money which buys whatever improvements, modern developments in technique or knowledge can bring to the treatment of naval personnel and to the promotion of their effectiveness. Medicine is changing now, if the problems themselves were unchanging. The effects of one of five explosives, poisons, infections and cold, the hazards of death, air, fire and water are all well known, it is the capability to protect from such effects and to treat what was once untreatable that are the principal goals of modern developments.

Even though the risks are greater those carrying them out are different. No longer is



## Bone Scintigraphy as an Investigative Aid for Dysbaric Decompression Injuries

B. E. Pearson, M. A. MacLeod, A. J. B. McFarland & A. C. Houston

### Introduction

Dysbaric decompression is a compressional hazard occurring as a direct result of exposure to altitude environmental pressure. It is typically prevalent in compressed air workers,<sup>1,2</sup> and to a lesser extent in divers.<sup>1,3</sup>

Although decompression is associated with many forms of disease processes and trauma,<sup>4-11</sup> the current consensus has a common denominator in that they are forms of trauma and secondary trauma in compressed air workers and divers. The lesions have a characteristic distribution which is localized to the upper ribs, lower and upper humerus. It is considered to classify the lesions as "flex" lesions, which are the symptoms referred to as HNS chest pain and shaft lesions or joint arthralgic lesions affecting the bones underlying the articulation surfaces of the humerus and femur at the shoulder and hip joints. Joint arthralgia and shaft lesions may be referred to as "A" or "B" lesions in accordance with the classification introduced by the Medical Research Council Decompression Sickness Panel.<sup>1</sup> Shaft lesions are generally reported as being wherever pain, vascular lesions have a snapping point should be collapse or no lesions at the ceiling articulation surface. For instance, they are not usually clear joint arthralgic lesions in divers, rarely involve the hip joint whereas a significant proportion of joint arthralgic lesions in compressed air workers do involve the hip joint.

### Prevalence as assessed by Radiological Techniques

The diagnosis of dysbaric decompression has traditionally been by radiological techniques and many radiological surveys of grouped divers have been carried out in the last 30 years. These have revealed a prevalence of potentially diagnosed lesions ranging from 0.7 percent<sup>12</sup> to as striking as 46 percent<sup>13</sup>. A comprehensive survey of Royal Navy divers in the United Kingdom between 1966 and 1977 revealed a 5 percent prevalence of potentially diagnosed lesions. Current procedures to assess Royal Navy divers in the United Kingdom have the figure must be interpreted with caution in view of the very small numbers of divers with positive lesions and the fact that in the late 1970's a significant number of experienced but relatively young divers left the Royal Navy to go into the commercial diving industry.

The most comprehensive figures available for prevalence in the commercial diving industry are those available from the Medical Research Council Decompression Sickness Central Registry where 31,947 records of commercial divers have been kept since 1950 together with details of their routine medical examinations. Recent reports from this Registry,<sup>14,15</sup> which now holds data for nearly 5,000 divers have highlighted positive correlations with certain features of the claimed diving history such as depth of deepest dive (Table 1), depth of deepest saturation dive (Table 2), length of diving career (Table 3) and

belonged to decompression sickness (Table 4). Certain physical and physiological characteristics of the divers with positive lesions appeared to be significant. These were increases in the mean body weight, shindole thickness and the packed cell volume.

The overall prevalence of periodontal disease in non-smokers in congested slums has been shown to be the Knapal in India (from 1.1 per cent in 1975 to 4.1 per cent in 1981). If suspected lesions are added the overall prevalence becomes 8.2 per cent. The percentage of pure atrophic lesions represents 36 per cent of the total number of periodontal lesions that only 14.6 per cent of the pure atrophic lesions have progressed to suppuration and other evidence of post dentifrice atrophy.

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

The diagram is necessary for reproducing the keypoint figures for they represent the best available information on prevalence. They do, however, reveal the shortcomings of ecological diagnosis as demonstrated. Other important ecological features of dykeless environments, it is known that a few ecological features post-date the hypothesis itself for reasons as in those above and as well as will be dependent on their past may be as long as two years to appear. There is some post-mortem evidence to show that ecological diagnosis may give a very poor indication of the full extent of home damage.<sup>10,11</sup> A further limitation of ecological techniques is their inability to give any information about the precise pathological process causing the chain of events that result in the ecologically evidenced manifestation, that is associated with home repair. Although the precise pathology is not fully understood, it is generally accepted that the lesions could have been of either infectious or the home nature which then results in infection and subsequent random outbreaks.

**Table 1**  
 (Synthesis, characterization, and IR spectra of the polyimides)

Table 3  
Hydraulic conductivity and maximum depth of  
infiltration after 100 mm cumulative stress with  
various stress increments

### Results: 17

**Table 4**  
Chlorophyll *a* and total chlorophyll (chlorophyll *a* and chlorophyll *b*) contents in 1999 and 2000

<sup>1</sup>For additional discussion of points on (H2C) Parliament/State II see discussion below concerning the common world above.

**Abstract**

In 1918 it was proposed to generalize the diagnosis of the lesions of aliphatic monosaccharides that was possible by radiolysis; the technique of bomb radiolysis was first investigated by the Royal Navy in 1932 when it was necessary

scintigraphic survey was carried out on eight Royal Navy ships with radiologically established lesions that had been identified in the 1944-1951 radiological survey. The bone-seeking imaging agent used in this survey was  $^{99}\text{Tc}$ -Technetium (Tc) Poly phosphate. Although some radiomimetic such as Fluorine and Strontium are bone seeking in their own right,  $^{99}\text{Tc}$  is highly suitable for labelling non radiomimetic bone seeking compounds for imaging purposes.  $^{99}\text{Tc}$  has a relatively short half life and gives a very low whole body radiation dose together with a suitably low radiation dose to the target organ (the bone) of interest and satisfactory image (Table 5). It is also easy to produce  $^{99}\text{Tc}$  and label compounds, for imaging techniques, basically from scintigraphy, was carried out with  $^{99}\text{Tc}$  Polyphosphate but after some experience with  $^{99}\text{Tc}$  Diphosphonate (Diphosphonate) a change was made to  $^{99}\text{Tc}$  Methylene Diphosphonate (MDP) in 1977 and this remains the imaging agent of choice (Table 6). Cases have been observed for superiority of  $^{99}\text{Tc}$  Hydroxy methylene Diphosphonate (HMDP) in an

emergency agent but a recent report<sup>11</sup> suggests that  $^{99}\text{Tc}$ , MDP and  $^{99}\text{Tc}$  HMDP have equal merits as bone imaging agents allowing both quantitative and qualitative estimates from scintigraphy.

The 1972 experience with bone scintigraphy showed an increased uptake of radiomimetic in lesions where X ray appearance was still soft whereas a dense obvious X ray lesion showed no increased uptake. Two X ray lesions were of particular interest in that they had been initially detected some six years previously and yet still showed increased uptake of radiomimetic. Such an increase in uptake is generally held to be evidence of increased osteoblastic activity and evidence of new or renewed bone formation.<sup>12</sup> In view of the limitations of radiology which were evident and the need to assess the diagnostic value of bone scintigraphy a formal project commenced in 1976.

#### Experience with Bone Scintigraphy

Experience to date has fulfilled the initial aim of the formal project and has proved conclusively that  $^{99}\text{Tc}$  MDP is a highly sensitive bone imaging agent capable of

Table 5  
Radiomimetic of principal use in bone imaging  
polyphosphates, January 1976

	$^{99}\text{Tc}$	$^{89}\text{Sr}$	$^{45}\text{Ca}$	$^{90}\text{Sr}$
Half-life of radiopharm	6.02 hours	$^{89}\text{Sr}$ generator	131.28 days	$^{90}\text{Sr}$ generator
Half-life of $^{99}\text{Tc}$ Tc	6.02 hours	2.76 hr	1.59 hr	5.2 hr
Most useful for scintigraphy (mCi)	0.05	4	4	15
Delay in start of scintigraphy	2 days	0 hr	4 hr	2-4 hr
Image local uptake	50	50	50	50
Anticancer agent in				
bone	1.4%	0.6%	0.4%	0.4%
marrow	1.1%	0.4%	0.4%	0.1%
whole body	0.4%	0.4%	0.1%	0.12%
Anticancer agent of				
antibody to be	0.005 <sub>2</sub>	0.005 <sub>1</sub>	not	0.1 <sub>1</sub> (large)

Table 6  
Radiating haemorrhoids causing IBS during 1974-1982

Test sphincteromyotomy	Period of onset	Sex	Duration of symptoms following treatment
25% Tr. Phosphate	1/79 to 1/79	Male	24 to 100 d
25% Tr. Phosphate (Continued) + acetaminophen 100 Ibuprofen Chloride	1/74 to 1/77	Male	75 to 100 d
25% Tr. Phosphate (Phosphate) (100%)	1/79 to 1/82	Female	50 to 100 d

consistently detecting lesions of sphincter incompetence within three days of onset of hyperbaric exposure.<sup>18</sup> However the experience over the period 1974-1982 has narrowed certain questions raised earlier and has seen the refinement and advancement of the radiographic techniques and complementary investigations. These are best considered in the distinct areas of diagnosis, treatment and research.

### Diagnosis

In the period 1974-1982 a controlled study was carried out on 26 divers (average age 28.7 years) who took part in 1.7 oxygen/helium saturation dives at the Admiralty Marine Technology Establishment (Physiology Laboratory) (AMTE/PLA) Aberdeen. Tables 7 and 8 give details of the saturation dives carried out and the number of dives started out by individual divers. Divers were subject to radiography in the week before the dive, three days after the completion of decompression, and then at intervals of three months, six months and one year after the dive unless further saturation dives intervened. Thelmaer radiography was carried out routinely. No change was made in the routine normal requirements for leg bone and joint X rays.

Twenty of the 26 divers showed post-dive radiographic changes of a persisting nature so that they were radiated at three

Table 7  
Saturation Dive number (1974-1982)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 8  
Statistics of the saturation dives

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

days and persisted for a minimum of six months. Table 9 shows that they were sustained fairly evenly throughout the dives and that two of the radiographic changes occurred in divers who had never signs of 'joint pain,' only decompression sickness. In both cases the divers suffered from bilateral knee pain and sustained unilateral radiographic changes to the lower femur. However in one case the radiographic changes were in the leg bone affected and the other knee was symptomatically less involved than the companion knee who was and sustained post decompression radiography.

There was only one instance post-dive



Table 4  
Distribution of post-dive radiographic changes in the instrumented

Dive	Decompression table used	Number of divers	Cases of decompression symptoms	No. of divers with post-dive radiographic changes
12th	100 percent (usual)	3	0	0
13th	100 percent (usual)	3	0	2
14th	100 percent (usual)	3	0	4
15th	100 percent (usual)	3	0	2
16th	100 percent (usual)	3	0	1
17th	100 percent (usual)	3	0	1
18th	100% (5%) hyperbaric and	3	1	1
19th	100% (5%) hyperbaric and	3	0	0
20th	100% (5%) hyperbaric and	3	1	1

\* Decompression of the 100 ft/100 percent usual decompression table.

\*\* The radiographic changes were in the diver treated for decompression at 100 ft/100%.

radiographic change following a dive post known to have been subject to intense during the dive.

The instrumental distribution of the lesions (Table 10) is entirely typical of the distribution of radiographically diagnosed lesions and no lesions were seen at any depth nor during radiography. Thus 12 radiographic lesions occurred in 12 divers is explained by the fact that eight divers had one distal post-dive lesion and one diver had single post-dive lesions after two separate dives.

None of the radiographic lesions occurred in typical early X-ray appearance of systemic osteonecrosis after intervals of nine months, 12 months, two years and five years. The lesions occurring in 9 and 12 months were at both lower stages of a

single diver. Both the diver and the diver with the lesions becoming X-ray positive in two years did not have any further hyperbaric exposure following the dives giving rise to the radiographic changes. In all cases there was good unassisted correlation between the radiographic and X-ray changes although the early X-ray changes were much smaller in extent than the radiographic lesions. This finding has been confirmed by further studies since 1960 (not shown).

The 16 lesions which did not progress to X-ray changes proved to be the most interesting and puzzling part of the study. Four have persisted unchanged for periods of five years, have approached seven in two years, have been persistent for periods in excess of two years, and three have persisted for over one year. Commonly seven lesions occurred or recurred at periods ranging from one to five years. The significance of these correlations will be discussed later.

There was no correlation with the actual length of the dives which, with varying times spent at maximum depth, lasted from  $\frac{1}{2}$  to 20 days. All dives maintained an oxygen partial pressure of 0.4 bar throughout the dive. Many of the dives involved extensive physiological and biochemical monitoring.

Table 10  
Instrumental distribution of radiographic changes

Number of lesions	Number of divers	Number of lesions	Number of divers
1	10	10	10
2	1	11	11
3	0	12	12
4	0	13	13
5	0	14	14
6	0	15	15
7	0	16	16
8	0	17	17
9	0	18	18
10	0	19	19
11	0	20	20
12	0	21	21
13	0	22	22
14	0	23	23
15	0	24	24
16	0	25	25
17	0	26	26
18	0	27	27
19	0	28	28
20	0	29	29
21	0	30	30
22	0	31	31
23	0	32	32
24	0	33	33
25	0	34	34
26	0	35	35
27	0	36	36
28	0	37	37
29	0	38	38
30	0	39	39
31	0	40	40
32	0	41	41
33	0	42	42
34	0	43	43
35	0	44	44
36	0	45	45
37	0	46	46
38	0	47	47
39	0	48	48
40	0	49	49
41	0	50	50
42	0	51	51
43	0	52	52
44	0	53	53
45	0	54	54
46	0	55	55
47	0	56	56
48	0	57	57
49	0	58	58
50	0	59	59
51	0	60	60
52	0	61	61
53	0	62	62
54	0	63	63
55	0	64	64
56	0	65	65
57	0	66	66
58	0	67	67
59	0	68	68
60	0	69	69
61	0	70	70
62	0	71	71
63	0	72	72
64	0	73	73
65	0	74	74
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ling no correlation was observed between any of the measurements and the post-dive otoscopy changes.

Full details of this study have been reported elsewhere<sup>22</sup> and the study of experimental dives has continued with results that are entirely in keeping with those reported here.

#### **Further Studies**

In an attempt to understand the importance of the preceding otoscopy changes revealed by the 1973/1981 study which did not progress to X-ray changes and in further otoscopic changes were discovered in dives the opportunity was taken to study five of these dives with changes in the bones using the techniques of resonance and resonance compensated dual tomography (E and T CAT scanning). These techniques, in conjunction with normal otoscopy and radiology, allowed a three dimensional visualization of the tomographic (E CAT) and X-ray (T CAT) changes. Both techniques showed clear evidence of the bones being malleus and T CAT scanning showed evidence of increased involvement with uptake changes in the malleus bone. Of the two techniques, T CAT scanning proved more suitable as an investigation tool as T CAT is used in direct contrast to those for normal tomography where considerable more radiation exposure comes from T CAT scanning. However, the T CAT scans appeared to confirm the concept of malleus marginal malleus and anterior otosclerosis following inference. This process has been ascribed to the effects of nitrogen on metabolism.<sup>19, 20</sup>

More recently significant contributions to the understanding of these otoscopic lesions have been made by the Hockley Medicine Department Royal Naval Hospital, Haslemere using quantification of acoustic side systems of <sup>222</sup>RnTMDP in the form of interest if it is possible to assess the malleus perfusion of affected bones.

To date, eight dives with changes in malleus tomography have been investigated with this technique. What is stated may not have had entirely otological changes. Two dives and two others showed significantly disturbed acoustic rate constant over the affected areas and the two dives without personal X-ray changes became X-ray positive within a further three and four weeks respectively in both cases on malleus after the appearance of the initial tomographic changes. The other five dives had normal or increased secretion rate constant. The technique described more fully by Medford & Graham<sup>23</sup> appears to be able to identify these tomographic lesions which will progress to X-ray changes, the initial factor being diminished malleus microvascular perfusion (apex of malleus). The technique has been successfully extended to predicting the time of otoscopy changes observed in otoscopy-induced otosclerosis lesions. What remains to be seen is the efficacy involved in predicting otoscopic lesions with normal perfusion which do not progress to X-ray changes and which now appear to exist in other forms of otosclerosis as well as the delayed variety. The concept of continuing malleus osteoblast activity in otosclerosis in terms of explaining the increased uptake of <sup>222</sup>RnTMDP has the pathological reality of such long term osteoblast activity seems much less plausible. The answer to this question awaits an histological solution.

#### **Other Diagnostic Studies**

Even though radiology is still regarded as the definitive diagnostic procedure for dysharacterisotomies and the criteria for a positive diagnosis are well established,<sup>11</sup> the initial X-ray changes are often very difficult to detect and other unrelated radiology and otoscopy of bone may add to the diagnostic difficulties.<sup>1</sup> Bone tomography offers a valuable refinement of any otoscopy enquiry as these described X-ray

images and has been routinely used in this sense for the last half century. When used to X-ray screening of divers' skulls, bone radiography should at least be regarded as an essential complementary investigation for any detailed clinical examination.

#### **Relationship between Decompression Sickness and Dysbaric Osteonecrosis**

Although bone disease that could decompress sickness particularly in the form of joint pain or other musculoskeletal manifestations has a quite different etiology to dysbaric osteonecrosis (except in terms of their common link to decompression itself) the MRC Reports, figures appear to show a group susceptibility to dysbaric osteonecrosis in divers who claim to have had decompression sickness. It has also been claimed that the ulcers and pains which are often thought to be an inevitable accompaniment of decompression, particularly those occurring during, may be connected with the medullary infarction which leads to dysbaric osteonecrosis.<sup>14</sup> The 1971/1968 study suggested that for most divers, post-dive radiographic lesions could not be linked to any symptoms. Since 1968 a total of 14 divers with extensive skeletal manifestations of decompression sickness (some with multiple joints and from air and oxygen/bellium diving, have since had radiography after therapy or completion of maximum decompression. Only three of these divers have had radiographic changes and in only one case was the radiographic lesion in the same bone in the past (in left knee joint with a radiographic lesion in the left lower femur). Therefore the relationship can only be casual in the individual and the inference is reinforced that dysbaric osteonecrosis is a separate manifestation of an independent decompression which may also give rise to decompression sickness. One interesting case in this particular mode was referred to in the Navy's 1961 hypothesis: therapy had only been partly successful in

relieving his shoulder, elbow and wrist pain. Radiography showed a distinctive picture of an inflammatory process in these joints and the patient was shown later to have Scurvy's syndrome and not decompression sickness.

#### **Bone Radiography as a Routine Screening Procedure**

Following the demonstration of the ability of bone radiography to identify bone lesions as a very early stage bone radiography is particularly important as a routine screening procedure for divers. The few who body radiations exposure incident (provided a high fluid intake and frequent voiding of the bladder) is accompanied completely and immediately with the appropriate measures for Scurvy's X-ray screening procedure. Although the important potential danger (in equivalent of drinking) is used when X-raying male divers. Reducing the capital cost of equipment: radiography light source is a cheap screening method than X-rays.

Accordingly, a pilot study has been in progress since January 1962 which uses radiography as the sole routine screening method for a group of 25 Royal Navy saturation divers. The protocol itself has limited X-ray investigation of any cases of radiographic abnormality. Importantly (given) experience does not suggest that a large number of radiographic radiographic lesions will be revealed.

#### **Justification for Continuing Research into Dysbaric Osteonecrosis and Routine Screening of Divers**

The persistence of dysbaric osteonecrosis in commercial divers remains as rare and is related to groups as high as 17 percent. If it is accepted that there is a constant medullary infarction it must be regarded that there is a very slight but significantly lowered risk of subsequent malignant disease of bone<sup>15</sup> and three cases of osteosarcoma changes have been described in the long term study of compressed air





testing followed by exposure to an increase in ambient pressure in the compression chamber (HBF, Douglas).

#### Methods

Each subject had been found to be suitable to equilibrate his middle ear pressure at a depth equivalent of three metres of water. A Grason-Sedler 1733 middle ear analyzer was used to measure the middle ear pressure for the given ear over the compliance and middle ear pressure had been ascertained the Bunscheim function test was performed. During the test sequence the pressure within establishes a selected pressure within the external auditory meatus. The pressure transducer detects any change in the pressure level when the Tympano- or Valvulae manometer is performed. It then was that had no an expected Bunscheim dysfunction no deflection was produced on the positive

pressure curve. Fig 1 demonstrates the tympanogram and Bunscheim function test of a subject with bilateral Bunscheim dysfunction. It is to be noted that the middle ear pressure lay within the range regarded as normal while the induced positive pressure curve on the Bunscheim function test reveals no deflection either positive or negative on performance of the Valvulae or Tympano manometer.

Fig 2 demonstrates the deflections obtained on the positive pressure curve when the Valvulae manometer is performed while fig 3 shows the deflections produced on performance of the Tympano manometer in air with positive Bunscheim function.

It should be noted that on performance of the Valvulae manometer the deflection upwards and is reversibly instantaneous while on performance of the Tympano manometer the deflection is downwards though the negative deflection may be preceded by an

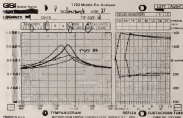


Fig 1 Tympanogram and Bunscheim function test of a subject with bilateral Bunscheim dysfunction. The tympanogram of the right ear (solid line) and left ear (dashed line) show the Bunscheim function test (Bunscheim test) of the right ear (solid line) and left ear (dashed line) showing no deflection on performance of the Valvulae or Tympano manometer.

small small positive deflections which coincide with the small positive pressure phase in the anapnoea, which is immediately followed by the negative pressure phase.<sup>1</sup> In a proportion of cases the reduced positive middle ear pressure can be varied without the performance of any muscular activity. Fig. 4 demonstrates that both ears are reacting to induced positive pressure and equilibrating an induced negative pressure without any muscular activity being performed.

The 121 subjects who were subjected to direct or reflexive processes of the eardrum and middle eardrum during the weeks after operation. Postoperative function testing was carried out after which each subject was exposed to an increase in external pressure.

## Results

Four hundred and thirty-two ears in 121 subjects were tested. Twenty-three sub-

jects had a confirmed Eustachian dysfunction. Fig. 5 demonstrates that positive function is present in one ear but absent in the other. Those ears that had positive Eustachian function were able to equilibrate their middle ear pressure at a depth equivalent of three metres of water while those ears with absent Eustachian function remained at Grade 1 ear barotrauma.

All those ears that on Eustachian function testing had no deflection on the positive pressure curve on performance of the Valsalva or Toynbee manoeuvres were found to be unable to equilibrate their middle ear pressure at a depth equivalent of three metres of water two weeks after operation. 140 subjects were demonstrating either testing of an induced positive pressure or deflection on the positive pressure curve on Eustachian function testing.

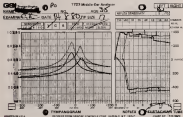
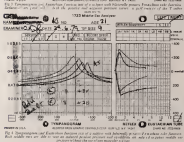
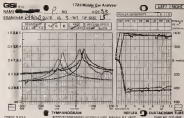


Fig. 1. Eustachian dysfunction in a subject with normal function. The subject had a normal middle ear pressure of 0.005 mmHg. The subject was exposed to a simulated ascent of 300 ft (100 ft) per second. The Eustachian function was normal in the subject's right ear, but was absent in the left ear. The subject's middle ear pressure remained at 0.005 mmHg throughout the ascent.







3. *Topotec and Valsalva tests.* The ability to develop a negative pressure in the respiratory tract during Topotec's manoeuvre, plus equalization of the internal negative pressure in the middle earing pressure by mucous swallowing, indicates deviated nasal function, but the ability to produce a negative middle ear pressure on Topotec's test and a positive nasopharyngeal pressure on Valsalva's test does not *di*f ferentiate between normal and abnormal function.

4. *Middle ear pressure recordings outside the range of values of water column poor Eustachian tube function.* Normal middle ear pressure indicates adequate initial time test, but only at the moment of testing and under test conditions.

#### Summary and Conclusion

A technique for assessing Eustachian function in ears with severe respiratory

troubles is presented. Forty hundred and forty two ears were investigated, 23 of which usually had positive Eustachian function at presentation. The positive function was confirmed by carrying out Politzer's function testing and exposing the subjects to an increase in ambient pressure. Those ears that had positive Politzer's function, were able to equilibrate to their middle ear pressure at a depth equivalent of three metres of water while those ears with Eustachian tube dysfunction remained at Grade 1 and barotendinitis. One of the 17% subjects who underwent operation 161 subjects had bilateral positive Eustachian function six weeks after operation, as demonstrated by the production of a deflection on the positive pressure curve on performance of the Topotec and Valsalva manoeuvres or by the identity of the test to test an ambient positive pressure. Those ears that produced a positive Eustachian function test were

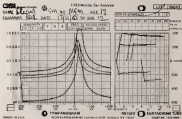


Fig. 1. Tympanogram and Eustachian function test of a subject with bilateral severe deviated nasal function. A deflection on the positive pressure curve on the Valsalva and Topotec manoeuvres are produced.

able to equilibrate these models was present at a depth equivalent of 18 meters of water.

The 161 subjects with bilateral positive functions have all undergone subsequent escape work training and have made escapes from 18 meters without requiring oxygenators.

The technique described is an improvement and not a replacement for the limited in situ measurements available for measurement of elastoheme function in rats with lateral type positive functions.

With the new generation of elastoheme apparatus instruments which are readily available, it is now possible for the clinician or researcher to carry out elastoheme flow rate testing during their hours with minimal expenditure of time.

The principle involved in this test is the same as that used in the classical Torgersen and Valeri's curve escape test as reported

as downward deflection is produced on a horizontal trace.

The ability of curves seen to vary as in dorsal positive pressure appears to be dependent on the size of the measured air cell system. A poorly isolated system, even on a dorsal positive pressure, while it will avoid system flow rate work. This difference is being investigated at the present time.

#### Acknowledgements

I should like to thank CMT R. Watson, MEM, POMA, G. Doyle and LMA A. Dones, the instrument technician in the DRI, Department, RSHI Harbor (staff of the Submarine Escape Training Team at HMS Dolphin) who exposed the subjects to an increase in ambient pressure in the test pressure chamber, the records and values sent to the Submarine Service who have made this work possible and who are participating in further investigations into

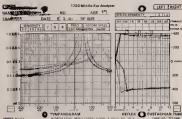


Fig. 7. Pressure and reflex response to a test of the subject in Fig. 6, as seen on a pressure 10- and reflex test as per Fig. 6. The pressure curve is shown on performing the "Pillory test" as in Fig. 6.

Department of Anatomy and the Department of Clinical Photography who produced the figures demonstrating the Eversmann face mask 1934.

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### BOOK REVIEWS

#### WILEY & LEVINE SHORT PRACTICE OF

**WHEATLEY** 1966, 4th ed. Edited by A. J. Wheatley. London: W. B. Saunders Co. 1966. 128 pp. 10s. 6d. (hbk). 1966. 128 pp. 10s. 6d. (pbk).

It is a pleasure to read a short practice of anatomy, one of the few of this nature of which I have read. It is a pleasure to read a short practice of anatomy, one of the few of this nature of which I have read. It is a pleasure to read a short practice of anatomy, one of the few of this nature of which I have read.

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**FUNCTIONAL ANATOMY OF ORBITOCULUS**  
**SYNOPSIS** 1966, 1st ed. Edited by A. J. Wheatley. London: W. B. Saunders Co. 1966. 128 pp. 10s. 6d. (hbk).

It is a pleasure to read a short practice of anatomy, one of the few of this nature of which I have read. It is a pleasure to read a short practice of anatomy, one of the few of this nature of which I have read.

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**Stress Fractures at Commando Training Center Royal Marines, Lympstone —  
A Retrospective Survey (September 1959 — October 1961)**  
G. W. B. CRAIG

**Abstract**

The problem of stress fractures is still regarded as a controversial subject in many quarters. It is difficult to study the condition in the laboratory, and it is consequently regarded as a field condition. Following a review of the literature, the author reports on a series of 15 stress fractures of the tibiae of 10 recruits at the Commando Training Center Royal Marines, Lympstone, Devon, during the period of September 1959 to October 1961. It is suggested that stress fractures are caused by the onset of rapid strenuous exercise, that the fracture site is located in the middle third of the bone, that the fracture is a fatigue fracture, and that the fracture is a stress fracture.

Stress fractures of the tibiae are a common condition in recruits at the Commando Training Center Royal Marines, Lympstone, Devon, during the period of September 1959 to October 1961. It is suggested that stress fractures are caused by the onset of rapid strenuous exercise, that the fracture site is located in the middle third of the bone, that the fracture is a fatigue fracture, and that the fracture is a stress fracture.

**Introduction**

The close association between military training and stress fractures of the metatarsals is well known indeed, such fractures are commonly known as "march fractures" and by the French as *plage de marche* (Lévesque 1955). Stress fractures were first recognized by a German military surgeon, Reichenow, in 1855<sup>1</sup> and there have been numerous reports from training camps around the world ever since. Commando Training Center Royal Marines (CTCRM) is no exception, and the high incidence of stress fractures of the metatarsals and other bones has been reported in this journal in the past.<sup>2</sup> Although metatarsal stress fractures are probably most common, stress fractures of the tibia also occur frequently, particularly in long-distance runners. In one survey in Finland, which concentrated on soldiers and specifically excluded Servicemen, three stress fractures were found to be almost three times as common

as non-stress fractures.<sup>3</sup>

In fact stress fractures may occur whenever normal stress is placed on bone and as well as in foremen and soldiers they have also been reported in the elderly.<sup>4</sup> The ideas<sup>5</sup> on pathology, radiological and anatomical criteria<sup>6</sup> and following surgical procedures which have altered the pattern of stress applied such as shoe replacement,<sup>7,8</sup> in one report a series of stress fractures at the neck of the tibia is described following the introduction of a particularly strenuous equal running technique stress training, that this runner had been stopped.<sup>9</sup> As well as the more common lesions of the metatarsals and tibia stress fractures have been reported in the femoral neck,<sup>10,11</sup> iliac crest,<sup>12</sup> scapula,<sup>13</sup> pubis,<sup>14</sup> arch<sup>15,16,17,18,19</sup> and radius.<sup>20,21</sup> Craig<sup>2</sup> also reports cases in the femoral shaft, metacarpals, talus, scapula, humerus, ribs, scapula, irregular bones and costal arch.<sup>2</sup> Obviously the occurrence of a stress fracture in one of these less common sites is likely to cause diagnostic difficulties and confusion of the probability of the type of making the correct diagnosis.

Another problem is diagnosis in the delay which occurs between the first symptoms and the appearance of the fracture on X-ray (usually in a peroneal fracture at the fracture site or in a humeral neck). This delay may be as long as two months, stress fractures of the iliac crest a problem has emphasized by Craig in 1958.<sup>22</sup> The diagnosis must usually be made on clinical

surveys alone. This has led to the use by some radiologists of osteonutrient bone scanning to confirm the diagnosis.<sup>12</sup> The advantage of this technique being that changes are apparent very soon after the first symptoms, however it is clearly not applicable in the vast majority of cases.<sup>13</sup> A high index of suspicion remains the best diagnostic approach.

Although unilateral and bilateral stress fractures together are by far the most common, the relative incidence of the different types appears not surprisingly to depend on the pattern of activity in which patients have been involved. In an attempt to analyse the relevant factors in commando training at Lytchington a retrospective survey of all the radiographically confirmed cases occurring here, between September 1970 and October 1980 was conducted.

#### Results

A total of 109 cases of stress fractures were seen during the period studied; these included two cases of bilateral stress fractures, one of the tibia and one of the distal metatarsals, whilst the remaining patients were each regarded as a single incident for a total of 110 stress fractures. Four patients sustained more than one stress fracture during this period, so in all 115 patients were involved. Three of these four patients actually sustained a left fibular stress fracture, followed in each case by another stress fracture within a few months (one of the right tibia, one of the left tibia, and one of the left distal metatarsal). The other patient developed a fracture of the left distal tibia three months after developing one of the right tibia. This might be considered, but it seems likely that the stress put produced by one stress fracture of the lower limbs predisposes to the development of another.

There were 57 cases of unilateral stress fractures, 44 tibial stress fractures, three fibular fractures, two each of the scaphoid and femoral neck, and one of the ischial

#### pubis ilium.

Twenty-four cases occurred in recruits or junior members under training (40 tibial, 46 metatarsal and the others), right in young officers under training. One tibial (one metatarsal and one other) and one each of femur) was during the 4th Army Commando Course at St. David's Pitcair or Army paratrooper undergoing osteonutrient training (two metatarsals and tibial) and one tibial stress fracture was a junior NCO undertaking personal training for a more than event.

Figure 1 shows the monthly trends for tibial and metatarsal stress fractures. These two figures suggest no long term change in the total incidence, with a decrease in the number of metatarsal fractures and an increase in tibial fractures; the increased fractures may be explained in part by seasonal bone turnover over the same period the number of recruits in training at CTCM has been reduced by almost 50%, even allowing for a lag in the effect of this reduction on incidence the apparent decrease in metatarsal fractures is observed and the increase in tibial fractures becomes highly significant.



Fig. 1. Monthly trends of tibial and metatarsal stress fractures half period.

Figure 2 shows the age of patients at the onset of symptoms over half the cases occurred in 15 and 17 year olds, and no case was recorded over the age of 25; the average age in cases of metatarsal stress fractures was 18 years, and that of tibial cases 18.2 years.

In the past it has been suggested that there might be a predisposition of stress fractures on the left because of the habit of



Fig. 2. Degree most of symptoms are left-sided.



Fig. 3. Time of onset of symptoms — motor and sensory hemiparesis.



Fig. 4. Time of onset of symptoms — motor and sensory hemiparesis.

training time with the left side when marching as PT shows the body a loop in single other factors such as the number of the side have also been suggested. In fact although there is a slight preponderance of left-sided motor hemiparesis (Fig. 2), right side is not statistically significant there were virtually equal numbers of left and right side motor hemiparesis of the other lower. A larger survey would be needed to demonstrate any genuine difference between the two sides.

Figures 3 and 4 show the work of training in which symptoms begin in cases involving sensory or motor hemiparesis. Five of these patients with motor hemiparesis and seven with sensory hemiparesis were in a remedial group at the onset of symptoms and therefore temporarily outside the normal training programme. Their cases are not shown on the graphs. Although most fractures of all types appear to occur throughout the training programme, the high incidence of motor hemiparesis early in training (maximum weeks 3 and 4) and of sensory hemiparesis in the last six weeks of training is of considerable interest.

Analysis of the delay between the onset of symptoms and confirmation of diagnosis by X-ray shows an average delay of about a fortnight for all cases (12.7 days) however for motor hemiparesis the average was only 8.2 days and for sensory hemiparesis nearly three weeks (20.9 days).

### Discussion

The reasons for the relative increase in the number of left side lesions seen at CTGMB during this period are not clear. There has been no major alteration in the training programme over this period or in the facilities available to make the diagnosis. One possible explanation is the increased awareness of the problem amongst the medical officers and dentists in the Sick Bay, we may have been seeing just as many cases, but more in the past but failing to diagnose them. Even without

medical integration program to a complex fracture means comparatively late in the field, and the condition may be self-limiting in most cases.

The fact that stress fractures occurred mainly in young men probably reflects the average age of recruits in training; nevertheless there have been many older men in training at CTCRM over the period 1960-1980 training. All *Armed Communications Course* (BMR personnel) and the fact that no case occurred in recruits over the age of 25 is indicative that stress fractures are more likely to occur in 'immature' bones. This corresponds with Davis's observation in his survey of 300 recruits 60% occurred in patients below the age of 20 (average age 21.7 years).<sup>1</sup>

During the early part of training great emphasis is laid on marching and drill whereas the long distance 'speed marching' and running is both a gradual towards the end of training. The appearance of overtrained fractures with the earlier part of training, and stress fractures with the last few weeks tends to confirm the hypothesis that the former are produced by marching and the latter by running. The sports-physiological theory can be extended for the other types of stress fractures other than the broad category of 'overtraining'.

As has already been noted, stress fractures are increasingly slow to appear in X-ray and this may account for much of the delay in diagnosis. It is also possible that in the initial stages mechanical fractures are more painful and that patients seek medical advice sooner. Finally the degree of suspicion needed to diagnose mechanical fractures is less since almost no difference of diagnosis is required in the typical case. Thus stress fractures, however, are rarely diagnosed in the early stages of muscle strains or shin splints.

Some of the most unusual stress fractures are mostly of comment. Stress fractures of the femoral neck have been extensively

reviewed elsewhere<sup>2-5</sup> and the hypothesis that many if not all stress of such fractures in the elderly begin as stress fractures appears to be gaining credence.<sup>6</sup>

The occurrence of stress fractures of the pelvic arch in fit young adults although well documented<sup>7-10</sup> is not widely recognized. Indeed, one standard monograph on the subject does not mention the possibility except in children, the elderly and following hip surgery.<sup>11</sup> Failure to suspect a stress fracture is the case reported here led to a five week delay in diagnosis, the patient's pain being dismissed as a groin strain.

Stress fractures of the ischium are surprisingly rare perhaps because its constant nature of spring like movement bone well able to absorb stress. One of our cases occurred in a young officer recovering from a traumatic ankle fracture — despite warnings he attempted too much too soon during convalescence and it may be that his altered gait when running contributed to the development of the stress fracture of the ischium.

The other case occurred in a 17 year old recruit 32 weeks into training and although it was diagnosed within two weeks of developing symptoms no other contributory cause could be found.

### Conclusion

In any system of rigorous military training injury and illness attributable to that training are bound to occur and the suffering, inconvenience and expense incurred must be carefully balanced against those needs of the Service which that particular training seeks to fulfil. As medical officers it is our duty to suggest ways in which such morbidity can be reduced and with regard to stress fractures it would be easy to say that if this number of cases are occurring, then training must be too rigorous. Approximately 1,000 recruits and junior officers passed through



training in CTCRM over the period studied 14 stress fractures occurred in 18 patients in this group, an order which approximately 75% of those undergoing recruit training were allocated. However, young soldiers need learn to march and there is considerable training especially need, keep themselves fit and able to speed march fully loaded for long distances. This over training soldiers programme makes the number of stress fractures seen in CTCRM acceptable provided we are aware that no available factors are contributing to the numbers. If there is an easy solution to the problem of stress fractures in military training, then this survey has failed to reveal it. It is possible that if the age of entry to Royal Marine training was raised from 18 to 19 years, we would see fewer stress fractures, particularly of the metatarsals, and possibly less of the other problems associated with training adolescents. To a certain extent this is already happening since the current selection allows recruiting to be more selective. However, such a decision would need consider account of many other factors: military social and educational, as well as medical, which are beyond the scope of this paper.

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## Bullet and Missile Wounds in Northern Ireland

J. R. Ramsay

### Abstract

It is an experience of many wounds less than 20 years old, suffered chiefly in Northern Ireland over the last 15 years. Despite the wealth of experience and expertise, it is often very difficult to measure a wound with the accuracy of any particular weapon. The whole story is in movement, the characteristics of the wound-making agent and the weapon employed during a given time or place by a particular group. Royal Marines. The post-operative study area of the Belfast General Hospital. The study area of the Belfast General Hospital. The study area of the Belfast General Hospital. The study area of the Belfast General Hospital.

### Characteristics of the Wounding Agent

Small arms can be broadly divided into high velocity (HV) and low velocity (LV) weapons. High velocity weapons deliver the bullet into the tissue at speeds of over 140 metres/second and most modern rifles have a muzzle velocity much greater than this. Most pistols and sub-machine guns, however, are low velocity weapons, delivering the round at lower speeds of approx. usually 300-500 metres/second. This is an important distinction since wound characteristics are different in each group and they are roughly divided into the two categories by the speed of sound to be 140 m/s.

The types of weapons in most frequent use in Northern Ireland (Fig. 1) are pistols usually from LV rounds. Armed into HV — 5.56mm HV rounds. Armed into HV — 5.56mm HV rounds. Armed into HV — 5.56mm HV rounds. Armed into HV — 5.56mm HV rounds.

### High Velocity Bullets

The extent of wounding by a bullet depends on

1. The amount of kinetic energy possessed by the bullet on impact.
2. The behaviour of the bullet on flight.
3. The behaviour of the bullet on its course through the tissue.

On impact the bullet does not stop and usually exits from the body having passed a proportion of its energy. The impact velocity  $V_i$  is the velocity at the instant of striking and the residual velocity  $V_r$  is the velocity it has from the wound. The kinetic energy yielded by the bullet is  $\frac{1}{2}MV_i^2 - \frac{1}{2}M_rV_r^2$  where  $M$  is the mass of the bullet,  $M_r$  the mass of the residual bullet. The extent of wounding and it can be measured this extent proportionally with the mass and with the square of the velocity of the bullet. This explains the recent tendency for bullets to be lighter but of a higher velocity, which results in an overall increase in energy available on impact and maximum the number of rounds on individual soldier on a target. On impact the bullet is affected by the mass and shape of the bullet on impact and also by the various secondary wounding agents — gas pressure and motion (Fig. 2). There is a lateral movement in flight and penetration is a spiral movement in flight, both about the centre of gravity of the bullet. Motion is a rotational movement in small circles which forms the pattern shown. In addition to these movements, the HV round spins around on its axis and this is a result of the spin of the barrel of the barrel of the weapon. By virtue of this



Fig. 1. Bullet wounds in *Phrynosoma macleayi*. Top left: 12 gauge shotgun wound (HV). Top right: 12 gauge shotgun wound (LV). Bottom left: 12 gauge shotgun wound (HV). Bottom right: 12 gauge shotgun wound (LV).



Fig. 2. Diagrams illustrating the effects of a bullet wound. 1. A diagram showing a bullet entering a body and creating a cavity. 2. A diagram showing a bullet entering a body and creating a cavity. 3. Two circular diagrams showing the cross-section of a bullet wound, with the top one showing a larger cavity than the bottom one.

quoting studies the bullet possesses a gyroscopic stability after 100 metres of flight and may retain stability up to 1000 metres. However, if any excessive distance there, air is encountered the bullet will tend towards instability.

(b) Considering the two categories of HV and LV bullets again, there are certain characteristics of the behaviour of the bullet in the wound track and also in the behaviour of the tissues themselves. HV

wounds have a high kinetic energy, no impact and generally cause extensive tissue damage. This is achieved in three ways: a. Direct trauma to surrounding tissues by the passage of the bullet.

b. The cavational effect. A piston-like cavity is created by the HV round, this cavity having a very large diameter relative to that of the bullet. This cavity is caused by tissues continuing to part after the initial perforating force of the head of the bullet and it exists for only a very short period of time. The cavational effect causes considerable tissue damage and also causes a temporary vacuum which tends to suck in the fragments of clothing or wooden plank and other unaltered material. The wound is then contaminated immediately and due to the surrounding nervous it is particularly susceptible to bacterial infection.

c. The shock wave which results, the cavational effect may extend further than the force of the cavity and may cause damage to nerves and arteries at short distances from

unconscious. On arrival at hospital he was found to have a dirty wound on the left shoulder externally and an exit wound slightly larger on the posterior aspect. X rays showed a fracture of the humeral head and multiple fragments of bullet jacket embedded in the surrounding muscle. At operation there was found to be extensive tissue damage, surrounding the wound with a large volume of blood had to be removed. Two Avastin bullets rapidly fragmented on hitting bone and the remains of the bullet exited leaving only a relatively small exit wound.

Six months later the 54-year-old POC has full passive movements of the joint but no true active abduction due to the ongoing loss of blood. Other movements are reasonably good but he will probably not be able to continue in the General Duties Marine category.

Case 3 — 41V bullet wound (figs 4 & 5). This man was travelling on the back of an open Land Rover which had just turned northwards off the Springfield Road in Belfast when it was under fire from gunners hidden in a house on the south side of the Springfield Road. The range was approximately 100 metres and many rounds were fired from the two Curatol 60 rifles firing 0.30 inch armour piercing rounds. One of his arms was hit in the lower abdomen.

On arrival at the scene the victim was lying on the ground holding his arm over his abdomen although still breathing. It was not evident at the time where the bullet had entered but there was clearly a gaping wound on the left side of the face. Using a Laerdal resuscitator and pulling the tongue forward the airway was kept clear. An intravenous infusion of Hartmann's solution was set up and 100% oxygen was administered by mask. On the journey to hospital the airway blocked once for four seconds but cleared again on arrival. Resuscitation would have been impossible

while moving and an emergency tracheotomy was contemplated. On arrival at Magill Park Hospital he was quickly shocked with a potent energy functionless under anaesthesia was intubated with difficulty and he was taken to theatre where a tracheotomy was required. In the case the entry wound was found to be at the anterior border of the right mandibular, the bullet penetrating through the floor of the mouth and base of the tongue, through the left mandible and exiting through the left neck.

There has been some discussion about the indication for exploring such wounds.<sup>2</sup> In this case the entry wound was left open, packed and a small drain inserted, the base of the tongue was sutured, the remains of the mandible was wired to the maxilla by dental wires, and the exit wound packed with gauze. The wound was likely to have been viable on its passage through the soft



Fig. 4. Wound 41V at site of entry. (Anterior view of the mouth is indicated, mouth open.)



Fig. 5. View of bullet wound. Exit wound in right anterior mandible and in exit of the face.

inner of the teeth, but became unstable as it hit the mandible, causing the large gap to re-opened.

The patient made a good recovery, the mandible being repaired after two weeks. At the time of writing he is awaiting a bone graft for the defect in the mandible. The skin extends from healed well but there is loss of nerve supply to the tongue, with that speech is impaired. It is likely that in time he may return to full duties in the command.

**Case 3 — LV bullet wound (fig 5):** This man was on patrol in the Lower Falls area of Belfast when someone opened fire from about 75 metres, with a Vx antitank pistol (11 lbms) and a high velocity rifle. The wound caused by an LV round which passed the skin, mandible, cracked through the fibrous muscles of the upper arm and exited laterally. On arrival at the scene, the victim was not shocked. He had not at first realised that he had been shot but found he could not actually move his arm. The combat jacket was not obviously torn but his close examination of the skin the two small puncture wounds were apparent. The wound was dressed and he was given Sedona for analgesia on the way to hospital. In theatre the wound was explored and the wound track was found to be narrow with very little surrounding tissue damage in keeping with an LV wound. Six

weeks later he was back to full duties patrolling the streets. He has full motor movement of the arm and full power although he often experiences aching from the wound in cold weather.

**Case 4 — RPG 7 wound (fig 6):** This Corporal was the unfortunate target of a rocket propelled grenade attack while in command of a machine Gunner section on an advance patrol in West Belfast. As the vehicle moved on to the Falls Road it was hit by a missile from a range of 15 metres. The missile went through the driver's door without detonating, landed behind the driver's legs and detonated on the offside door adjacent to the vehicle commander's legs. On arrival at the scene, the medical team found the vehicle commander well as he was having very lightly already given a report on his radio. He had suggested almost total destruction of the base and much of both legs below the knee. He was shocked but still conscious although the blood loss had not been very great. He and the driver both had extensive lacerations to the face and hands. An IV infusion of Hartmann's 500ml was started, and Sedona was administered on sight in Magilligan Park Hospital. He was taken to theatre and bilateral above knee amputations were performed. He made a swift recovery and is now walking with bilateral limb prostheses.



Fig 5. LV injury inflicted on an LV round target. From where the exit hole of bullet hit (x) and entry hole of rifle.



Fig 6. RPG 7 wound. The unfortunate victim of a rocket propelled grenade attack on his legs.

the wound. This damage is not usually severe compared with that from a real bullet.

#### **Instability and Tumbling**

On encountering tissue mass, the HV round has a tendency to lose its stability of flight and may tumble, that is, any tendency for the bullet to move about its centre of gravity is accentuated and it may turn in any direction, often as much as 90 degrees. Clearly a much larger area of bullet is then presented along the track. Instability occurs more frequently in longer rounds and at lower ranges, and also tends to occur at very oblique angles, when the bullet may in fact be unstable and tumbling before impact. Any instability or tumbling increases the proportion of energy transferred to the tissues, and tends to cause confusion as to the wound track, rather than towards the exit wound.

#### **Fragmentation**

Fragmentation sometimes occurs with HV rounds, especially at longer ranges, in dense tissues and where bone is involved. Fragmented rounds can produce very extensive wounds.

#### **Density of the Tissue and Body Protection**

Tissues that are dense and homogeneous, such as muscle and liver, undergo severe circumferential damage whereas less dense tissues, such as lung, are surprisingly resistant to widespread damage. Any resistant tissue such as bone, cartilage and fibres can increase markedly tumbling and fragmentation. In a similar way, a rigid protective garment can cause this circumferential damage and also circumferential damage can be caused under the garment when it is not pierced. Modern flak jackets made from a nylon mesh absorb a large amount of the energy of an HV round and do not cause confusion, but they cause the flight of the bullet to become unstable and contribute to the manner of damage caused when it enters the wound. The problem of

producing a light and flexible protective garment has perplexed the Armed Forces for hundreds of years. The body armour recently introduced into Northern Ireland contains two rigid plates held across the front and back of the chest. The plates will stop many high velocity rounds and the surrounding nylon mesh will arrest fragments and low velocity rounds.

One of our patients was the target for an American round which actually entered between the front chest plate and the front of his chest wall without causing injury which must surely indicate that not only the Irish are lucky!

#### **Low Velocity Rounds**

Low velocity rounds cause injury by transfer of energy but the kinetic energy at impact is much less. The rounds possess the same characteristics of flight but in the wound they transfer energy at reduced speeds by direct tissue laceration, so rarely is tumbling. On comparison the entry wound may be smaller than the diameter of the bullet, a factor which often leads to confusion when initially assessing a casualty. The extent of necrosis and incidence of infection is much less than that from an HV round and there is often no necessity to explore the whole wound track.

#### **Anti tank Weapons**

The Russian made rocket propelled grenade launcher (RPG 7) was first used in Libya in 1973 and has appeared sporadically ever since (Fig. 2). This weapon fires the HEAT (high explosive anti tank) round. The bullet is usually manually propelled by



Fig. 2. RPG 7 rocket launcher.

the handset, bound by the socket on the mantle shelf as the spinning fan spread out radially, and it then detonated the mine charges on hitting a vehicle. An estimated value of copper is recovered by the explosive and propelled through the vehicle, making a penetration of some 100FC. The damage reported on Lord Bowden may well be less than that on estimated vehicles such as tanks.

#### Background to the Case

Turrentt grounds were common at the east of the town but became sporadic towards the east, although levels of street violence remained fairly high. The Regional Aid Post (RAP) with a staff comprising one Medical Officer, one CPOMA, one LMA and one MA, was centrally situated within the Unit's area. From here a 24 hour emergency service was provided with the ground ambulance to take on rubber work and a Reserve ambulance ready to move to the incident. The ambulance has a radio link to the RAP and to the casualty department at the Military Wing of Magness Park Hospital. The Reserve is fitted with an array of resuscitation resuscitation equipment around the stretcher. The total numbers involved in the Unit's response were:

8 patients/wounds

3 RAP/2 injuries (2 sustained)

60 rubber injuries for which 2 Med PAs were raised (those included one serious injury to an eye from a catapult missile which resulted in a detached lens, and a detached retina causing permanent loss of vision in one eye).

Many of the minor injuries were treated in the complete treatment by the company MA and seen at a later date by the medical officer.

#### Illustrative Cases

**Case 1** — RV bullet wound (Fig 4). This minor RGO was on patrol in the Down area of Belfast when he came under fire from

snipers hidden in a building approx. 100 yards away. The suspect being fired was an M16 Automatic rifle. Shots were returned but no hits were claimed.

On arrival at the scene the medical team found the victim fully conscious, with left shoulder injury and two wounds clearly visible. There was little obvious blood loss, but direct pressure was applied to both wounds and an intravenous infusion of Hartmann's solution was set up in the



Fig 4. Gunshot wound to the left arm of soldier who was shot in the back of the head. Although he was fully conscious, he died.



Fig 5. Gunshot injury to the neck of a soldier who was shot in the back of the head. Although he was fully conscious, he died.

### Principles of Immediate Care

Techniques of trauma investigation and treatment are covered very thoroughly in a number of very readable publications (1-4). The focus of first aid must at first rest with the 'buddy' beside wounds. One other man in the patrol must be quick to act in applying first aid damage wrapping, bleeding and resuscitation techniques. All men carry an IV dressing and are taught how to apply direct pressure to stop bleeding.

When the medical team consisting of either the MO or the CPTMA, plus one other man, maintains continuous of the numbers and severity of casualties is made. It is very important to evacuate them from the combat area on the ground before rushing away with the first available casualty. Direct wound pressure, wound occlusion and/or elevation is performed on the ground then in the casualty cube since an IV infusion of Rho(D) solution or Haemaccel is set up. The ambulance should start off only when the MO is satisfied that immediate care has been implemented, since resuscitation techniques become very difficult in a moving vehicle. While on the way to hospital the casualty department can be warned by the direct radio link.

As operations, high velocity bullet wounds must be explored, debrided of organic matter and packed with light, fluffy dressing.

The wound is then left open to drain and re-explored five days later. The remaining wound space is closed and the wound closed by delayed primary closure. Antibiotics, especially those for anaerobes, are standard treatment. Following the wound wound healing physiotherapy often plays the most important part in the gradual return to normal duty.

### Acknowledgements

My thanks are due to the Commanding Officer, medical and both key staff of the Commando Royal Marine, with whom it was a privilege to serve, also to Surgeon Commander B. Jolly RN for his help and to the Weapons Intelligence and Army Medical Services, in England.

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## Lung Abscess

W. M. Edmunds<sup>1</sup> and

### Abstract

*Four cases are described which illustrate the range of aetiology of lung abscess in paediatrics. (1) A *Streptococcus pyogenes* infection.*

### Introduction

A lung abscess is a necrotic lesion in the lung parenchyma which contains pus. It may arise as a result of several different pathological processes each of which leads to suppuration, and the discovery of a lung abscess should always result in a search for its cause.

### Aetiology of Lung Abscess

#### *Suppurative infections*

1. Infection by *Streptococcus viridans*  
*Parvulococcus* *Frederic* *anemobius*
2. *Mycobacterium* sp. *M. tuberculosis*
3. Fungi sp. *Aspergillus*
4. *Paratyphus*

#### *Emboli*

1. Pulmonary infarction
2. Septic emboli
3. *Brucella abortus* etc.
4. Tumour sp. carcinoma, benign tumour
5. Abscesses sp. blood vessel, lymphatic
6. *Mucor* etc. pus, foreign body etc.

#### *Other*

1. Cystic degeneration, necrosis sp. abscess, *Cystic* *multis*
2. Infected cyst
3. Trauma sp. infected haematoma, penetrating wound etc.
4. Extension sp. infected bone abscess, subphrenic abscess

The differential diagnosis is relevant but

in modern clinical practice only three of the above causes of lung abscess are commonly seen. They are bacterial infection, pulmonary infarction and malignancy; examples of each are presented in this review. As is customary<sup>1-3</sup> concerning lung tumours and tuberculous lesions have not been described here, although it should be remembered that squamous cell carcinoma remains the commonest cause of curable lung disease in British men over 50.<sup>4</sup>

Since the introduction of antibiotic, lung abscess has become less frequent; there has also been a change in the relative importance of the various aetiological factors. For example post-operative, aspiration pneumonia has become uncommon as anaesthetic techniques have improved at the same time septal embolization is now seen more frequently in the United States as a result of the complications of retrograde drug abuse.<sup>5</sup> The epidemiology of lung abscess is also changing as improved techniques enable clinicians to aspirate such as *intralesional*<sup>6</sup> and *Leptospira pneumophila*<sup>7</sup> to be recognized.

It is important to establish the aetiology of lung abscess in order to determine the prognosis. In our series of 97 cases the mortality was 33% for patients with systemic malignancy or non-malignant disease, compared with 2% for those with no underlying pathology.<sup>8</sup>

Four patients were admitted to the Royal Naval Hospital, Haslar with lung abscess which was much rarer in 1961. They

disturb the basal lobes, almost features and normal history of lung disease is modern practice.

#### Case Reports

**Case 1** A 76-year-old heavy smoker with a long history of chronic bronchitis was admitted in May 1981 with an exacerbation of chronic obstructive and a cough productive of purulent sputum. Examination revealed hyperinflation and cretaceous sputum, widespread wheezes and crackles in the chest, with a peak expiratory flow rate (PEFR) of only 90 litres per minute.

Blood gases confirmed respiratory failure ( $pO_2$  65 mm Hg and  $pCO_2$  71 mm Hg). A biopsy, growth of *Klebsiella pneumoniae* was isolated from his sputum and chest X-ray showed consolidation in the right lower lobe and a fluid-containing cavity in the right mid zone (Figs 1 & 2). Bronchoscopic biopsy showed almost complete occlusion of the right upper lobe bronchus by tumour biopsy of which revealed squamous cell carcinoma.

His chronic obstruction and respiratory failure was successfully treated with bronchodilators and steroids while the *Klebsiella* was eradicated from his sputum by intensive antibiotic treatment and physiotherapy. Although the asthma could not be eradicated, he improved symptomatically and was able to smoke home with a PEFR of 300 litres per minute and a reasonable normal tolerance.

**Case 2** This 58-year-old man developed multiple pulmonary mass nodules in 1979. He presented again in January 1981 with a recurrence of symptoms of chronic bronchitis, and fatigue. Examination revealed dyspnoea at rest and normal sputum and the blood gases suggested ventilation-perfusion mismatch with hypoxaemia ( $pO_2$  55 mm Hg and  $pCO_2$  38 mm Hg). The electrocardiogram (ECG) showed a right heart strain picture typical



Fig. 1 Case 1. Chest X-ray showing consolidation in the right lower lobe and a fluid-containing cavity in the right mid zone (arrow). (Reproduced with permission from the author.)



Fig. 2 Case 1. Chest X-ray of follow-up at 12 months after the first biopsy, in which a large cavity is seen in the right upper lobe (arrow). (Reproduced with permission from the author.)

of pulmonary embolism and the diagnosis was confirmed by a lung scan which revealed multiple peripheral defects. Chest X-ray was unchanged since 1979 and showed shadowing in the right upper zone. Despite emphysema his condition deteriorated and his chest X-ray showed

increasing shadowing in the right upper zone; the development of cavities becoming evident within consolidation (Figs. 3 & 4).



Fig. 3. Case 1. 14 yr. old boy, 1950. During admission shadowing in the right upper zone (F) as consolidation appeared in the right upper zone (upper film).



Fig. 4. Case 1. Two weeks later a large field of consolidation with shadowing of thoracic cage (upper film).

Fluoroscopic bronchoscopy was performed to aspirate pus from the right upper lobe; but culture of this was negative for tubercle bacilli and pathogenic organisms. His decline continued and he died following a further pulmonary resection six weeks after admission.

**Case 3.** Chronic lymphatic leukemia was diagnosed in a 77-year-old man in July 1950, and this was adequately controlled with intermittent courses of chlorambucil. He required admission to hospital in February and later 1961 with severe exacerbations of airway obstruction due to asthma and chronic bronchitis. During the earlier admission he developed a pyrexia and an

acute cough was made for appropriate infection particularly tuberculosis. Extensive investigations including liver biopsy, bone marrow aspiration and tracheal pressure failed to establish any cause for his fever which settled without treatment. There was no evidence of impairment of humoral immunity and immunoglobulin levels were normal.

In May 1961 his severe, daily obstructive required treatment with bronchodilators and high doses of oral and intravenous corticosteroids. Finally his chest X-ray showed hyperinflation of the lung fields with no shadowing and his sputum was sterile. However four days after admission he developed a pyrexia of 39°C and his chest X-ray showed consolidation in the right upper zone. Consolidation was demonstrable in the straight film (Fig. 5) and was well shown by tomography (Fig. 6). Tuberculosis was excluded but *Pneumocystis carinii* was cultured from the sputum. Despite vigorous antibiotic therapy he died two weeks later and autopsy showed extensive consolidation throughout the right lung with a radiating pneumonia in the upper lobe. Green negative septations were evident from the alveolar vessels.

**Case 4.** A previously healthy 15-year-old man developed a flu-like illness in October 1961 characterized by fever, headache, myalgia and malaise. Two days later he developed a persistent cough, profuse of yellow sputum and during the next three weeks he became anorectic and lost weight. He developed right-sided chest pain, night sweating and haemoptysis and his symptoms failed to improve despite several courses of antibiotics. On examination he was toxic and febrile; he had a tachypnoea and dry, inspiratory crackling. Abnormal breathing and a pleural rub were audible in the right and lower posteriorly. He had a polymorph leucocytosis and elevated gamma globulins.



Fig. 1 Case 1. Chest X-ray showing bilateral opacities in the lower zones and some consolidation in the right upper zone and in the medial part of the left lower lobe.



Fig. 2 Case 2. Chest X-ray showing bilateral opacities in the lower zones and consolidation in the medial part of the left lower lobe.

Although serological studies were normal, Chest X-ray showed a large abscess in the apical segment of the right lower lobe with surrounding consolidation (figs 7 & 8). Fiberoptic bronchoscopy revealed an obstructive lesion such as a tumour or foreign body. Sputum and blood cultures, including anaerobic techniques, failed to isolate the organism responsible. After failure to respond to treatment with ampicillin he dramatically improved on

terrazyl, penicillin, rifampicin and metronidazole. Within three weeks fever had settled, sputum production had ceased and his chest X-ray had almost returned to normal (fig 9).

### Discussion

This study very dramatically shows the progress of lung abscess as influenced by an underlying cause. In each of the first three cases the abscess was secondary to post



Fig. 3 Case 3. Chest X-ray showing bilateral opacities in the lower zones and consolidation in the medial part of the left lower lobe.



Fig. 4 Case 4. Chest X-ray showing bilateral opacities in the lower zones and consolidation in the medial part of the left lower lobe.



Fig. 1 Case 1. Abscess cavity after infection and pyrexial stage.

forming focus. Case 1 illustrated cavitation in collapsed and consolidated lung due to bronchi obstruction. Recent studies have shown the phenomenon to account for 9 out of 97<sup>10</sup> and 13 out of 211 cases of lung abscess.<sup>11</sup> As thoracic cavity may also have other malignancies, however, this is thought to be due to obstructive necrosis of the center of the lesion as its growth depends upon its blood supply and it is therefore surprising that rapidly growing lesions rarely cavitate, which up to 10% of slow growing squamous cell carcinomas do.<sup>12</sup>

Cavitation of pulmonary infarct is uncommon accounting for only 1.5% of the Dallas series.<sup>1</sup> Only a small proportion of pulmonary emboli cause infarction and a smaller proportion of infarct cavitate because of good collateral blood supply from the pulmonary and bronchial circulations.<sup>13</sup> Cavitation usually develops when an infarct is so large that the ischemic center becomes necrotic. Together with its resorption through the airways, secondary infection frequently supervenes and forms the abscess process.

Resolving abscesses remain the most common status of lung abscess. Klebsiella

pneumoniae and staphylococci are the most frequent organisms, isolated in previously healthy persons.<sup>14</sup> but in the debilitated or immunosuppressed group negative bacteria become more important. In Case 2 *Proteobacteria* caused a fulminating suppurative pneumonia in a patient immunosuppressed by chronic lymphatic leukemia and high dose steroid treatment. The autopsy finding of abundant organisms within the abscess cavity despite extensive antibiotic therapy suggests massive parasitic and failure of pulmonary alveolar macrophages to penetrate the wall of the abscess.

Case 2 is the only example of a primary staphylococcal abscess and the infection was highly secondary. Postoperative contamination accounts for about 10% of primary lung abscess<sup>15</sup> and it is important to note that the majority of the remainder are due to aspiration, oral sepsis and disturbance of consciousness (agitation, anaesthesia and coma). Alcoholism are particularly at risk due to impaired clearance mechanisms, poor dental hygiene and frequent episodes of sleep with the risk of aspiration.

Fiberoptic bronchoscopy was performed in three of these cases. The procedure is extremely valuable in the management of lung abscess: it allows therapeutic drainage of pus from the cavity<sup>16</sup> and culture of organisms without contamination by oropharyngeal bacteria at the same time abscesses formed in the trachea can be drained. The procedure which is undertaken under local anaesthesia is well tolerated and can be repeated frequently even in debilitated patients.

Management of lung abscess should be directed to identification of the responsible organisms, effective antibiotic treatment of sufficient duration and dosage, effective physiotherapy and drainage and finally diagnosis and treatment of the underlying cause. With intensive medical treatment surgery is less rarely required.<sup>17</sup>



## A Two Year Exchange Appointment with the Federal German Navy

St. A. Colledge

With the withdrawal from what were once traditional bases, opportunities for overseas posted accompanied appointments were lost to the Royal Navy but liaison with foreign Services has led to interesting exchange appointments. Since 1975 the Royal Naval Dental Service has had a close exchange with the Federal German Navy with Royal Naval dental officers serving in the dental clinic at the Ratt Naval Base. I was fortunate enough to spend two years with the Marinekommando including the tenure of three months at sea on board the *Schiffsfahrt Deutschland*.

I already had some knowledge of German but on hearing of my exchange appointment I embarked on a seven week intensive course at the Britannia Royal Naval College where my wife also gained a basic grounding in the language. It soon became apparent that this knowledge would be invaluable for once we had married and our married quarters and my preference had returned to the UK we were in at the deep end. The quarters a pleasant, compact flat on a modern high rise estate was one of a number within the private development built to the German Pattern. Living in the community in this manner allowed us direct contact with people in other walks of life.

The Naval Base in Ratt was largely destroyed during World War II. Much of the buildings have however been meticulously restored over the years and being that which has housed the dental clinic for the past decade. Since its inception in 1958 the FGDN dental branch has

undergone various administrative changes and for a brief period there was a unified Forces Medical and Dental Branch comprised in seven staff dental Sections but in October 1974 the system reverted to individual Navy Army and Air Force branches and on the same became part again of the Naval Dental Clinic. It comprised a large reception office (Fig. 1) linked by corridors to the six treatment rooms, an x-ray, six surgery with the two waiting rooms. There was also an X-ray room, a small dental laboratory, a bathroom, shower and one room one of which doubled as a treatment room. The post and surgery room was rarely needed during ship times, but was in constant use as the dental staff salaried at other times.

The reception had been so equipped over twenty years and now found to be the most modern in the FGDN with Beyer Brothers DRG units which I have my own a pleasure to use. The clinic was first purpose built and whilst the individual surgeries were large



Fig. 1. The reception area.

metal, low lead cupboards achieved an ergonomically efficient pay per effort (Fig 2).

The Flotilla Dental Surgeon Captain (D) who has worked in the dental clinic for the past 12 years, now has a dual role being also

Command Dental Surgeon to the Flotilla Command. In addition to the complement of five dental officers there were five permanent DAs and a number of male medical attendants who also worked in the clinic. The surgeons frequently operating with two dentists. As there is no true women's service when the Federal German Forces visit the DAs are women. They also assist in writing and polishing and extract in oral hygiene, there being no dental hygienists as we have them either in the form or in general practice. Most laboratory work was sent to civilian laboratories although simple acrylic work and model making was undertaken by a trained dental technician employed on the ship during his National Service period.

The dental clinic was responsible for over 8000 patients a year mostly from the Naval Base ships and other establishments in the area including the large Fleet Air Arm Base. The majority of the German Forces personnel were during their period of 18 months National Service and many joined with a poor standard of oral health. There was therefore no shortage of work and it would in fact have been very difficult to maintain reasonable standards had it not been for the opportunity of treatment on cruise doctors.

The basic principles of dentistry are the same the world over and I found no dramatic differences between German and British dentistry routine examination and surgical procedures being performed to much the same manner. There was however a difference in emphasis with more advanced conversation and perhaps rather less prevention and paediatrics. Indeed during my working days which started at 0700 routine work was only



Fig. 2 (Cont.) Low leadboard cupboards.

started on until 1800. Then when a well deserved "Fruchtlosh" of 200mg German coffee and milk, the remainder of the day was devoted to the most time consuming treatments with dentists largely reserved for multiple crown or bridge preparations. In my experience there were fewer patients with dentures bridges being prepared. I gained the impression that bonded porcelain work was coming to the fore although many crowns and bridges were constructed from gold with acrylic facings. Very few advanced porcelain jacket crowns were seen. Much of the treatment required laboratory work and all but the most simple was sent to civilian laboratories. The dental officer was free to choose a laboratory although there were a few favoured ones in order to facilitate accounting. The civilian laboratories were geared to high input and output and subject to arrangement (and the occasional plea that a patient was going to sail) gold rings could be returned within five days and a work was standard for a bridge.

Although there was no Officers Mess on the naval base there was a canteen where the full social life and departmental functions were often held on the spacious work bay or dental clinic. Karl has no far share of eating ships and consequently cooked parties, like being at its most strenuous during Karl Week when it became an RN ship week. With British exchange officers from other local establishments I was invited to become a member of the local Royal



## Engineering Work on Kiel

One of the most interesting items of my exchange assignment was the period spent as dental officer on the *Schleswig-Holsteinland*, the largest ship in the Federal German Fleet with a displacement of some 5000 tons. It is a purpose-built sea training ship for officer cadets, she has made regular training cruises since commissioning in 1961. She is the only DGB ship to have a permanent dental clinic, although this is only manned whilst at sea. It comprises a surgery with a Bager DGB unit (subsequently by now have been replaced by a Bager Drøpmag DGB) and a dental laboratory equipped for the construction of gold inlays and acrylic dentures. In former years a dental technician with the secondary role of DGB was carried. However, with the decline of laboratory work on board the technician was replaced by a dental DGB and the dental officer was responsible for his own laboratory work. The surgery was equipped for most dental procedures but most of my time was occupied in routine observation and extraction as there was no helicopter on board and previous attempts at forwarding laboratory work by post had failed.

Life was not all dentistry and the living my first month of sea time I was interested in the general running of the ship. One of the many ships with which we compared was HMS *Assurance* to which I was appointed for a day by *palukku*. We visited their command ports, Port of Lyngby, Helsingør, Helsingør and London. It was perhaps more than London was the only port where we did not have snow. After three months at sea *Schleswig-Holsteinland* returned to her home port of Kiel and I was quickly reintroduced to work in the naval base dental clinic.

With my many responsibilities often my work was more concerned to make the most of brief periods. In our first year as well as



Fig. 1. Schleswig-Holsteinland

visiting a great deal of the naval armaments of Austria, Denmark, and Holland but our first major holiday was always raised when I sustained an ankle injury and had to spend a week in the Bundeswehr Krankenhaus (the Military Hospital) followed by six weeks in plaster. Despite the stress, difficulties I did manage to do some work in the dental clinic and was in fact working at the time of HEDG's visit. With only weeks to go before leaving Germany we were able to fit in our delayed holiday — short holidays were in Denmark, Sweden, Finland, and Norway and the unforgettable experience of the exchange was made the Arctic Circle. On return, our time in Germany was almost at a close, our successors arrived and we were given a parting good-bye.

This exchange experience has been of great benefit to me as a dental as a dental officer and also personally. I enjoyed working under the slightly different conditions in the dental clinic and welcomed the opportunity of learning and practicing new procedures. As a naval officer the period on board the *Schleswig-Holsteinland* provided an insight into the Bundeswehr, highlighting not only the differences but the many similarities between our navies. Finally the experience of life in a foreign environment has been most rewarding and stimulating.

# 67 Years Ago — The Journal of the Royal Naval Medical Service Vol 1, No 1\*

T. P. O'Brien

## Author's Note

The article, together with a previous edition, was written in March 1966, after the 50th anniversary of the outbreak of the Second World War. The original text was revised.

Volume 1 No. 1, contains the proceedings and current knowledge of the time, many of the problems we are still dealing with today — as well as the knowledge and experience of the medical services of a more important of knowledge and experience. Volume 1, No. 1, contains the proceedings and current knowledge of the time, many of the problems we are still dealing with today — as well as the knowledge and experience of the medical services of a more important of knowledge and experience.

## December January 1915

Europe engaged in war. The British Empire and those of France, Belgium and Russia looked on battle with those of Germany and Austria-Hungary in one or two land and for the first time in the air.

On the outbreak of war there were two ships, dreadnaughts, torpedo boat destroyers, submarines in all actually entered in war. New weapons such as the torpedo were on board. The naval surgeons of naval officers had no experience of war. The doctors were mainly trained in dealing with battle casualties. Yet within two months it was to suffer its own first casualties.

Thus this review will start with the last page of No. 1, with those and volumes that have been a feature of every volume — the obituaries. Page 92-100 record two medical officers killed in action, four lost at sea and four deaths from natural causes.

The two major naval disasters of 1914 are recorded. Surgeon H. I. Hopps of HMS Aboukir and Surgeon E. E. Threlkell of HMS Cressy lost their lives when these first class armoured cruisers together with their sister ship HMS Hogue were all sunk.

\*From the December 1914, January 1915 and 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 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2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2919, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2931, 2932, 2933, 2934, 2935, 2936, 2937, 2938, 2939, 2940, 2941, 2942, 2943, 2944, 2945, 2946, 2947, 2948, 2949, 2950, 2951, 2952, 2953, 2954, 2955, 2956, 2957, 2958, 2959, 2960, 2961, 2962, 2963, 2964, 2965, 2966, 2967, 2968, 2969, 2970, 2971, 2972, 2973, 2974, 2975, 2976, 2977, 2978, 2979, 2980, 2981, 2982, 2983, 2984, 2985, 2986, 2987, 2988, 2989, 2990, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 2999, 3000, 3001, 3002, 3003, 3004, 3005, 3006, 3007, 3008, 3009, 3010, 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3018, 3019, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041, 3042, 3043, 3044, 3045, 3046, 3047, 3048, 3049, 3050, 3051, 3052, 3053, 3054, 3055, 3056, 3057, 3058, 3059, 3060, 3061, 3062, 3063, 3064, 3065, 3066, 3067, 3068, 3069, 3070, 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3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3504, 3505, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, 3549, 3550, 3551, 3552, 3553, 3554, 3555, 3556, 3557, 3558, 3559, 3560, 3561, 3562, 3563, 3564, 3565, 3566, 3567, 3568, 3569, 3570, 3571, 3572, 3573, 3574, 3575, 3576, 3577, 3578, 3579, 3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3624, 3625, 3626, 3627, 3628, 3629, 3630, 3631, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648, 3649, 3650, 3651, 3652, 3653, 3654, 3655, 3656, 3657, 3658, 3659, 3660, 3661, 3662, 3663, 3664, 3665, 3666, 3667, 3668, 3669, 3670, 3671, 3672, 3673, 3674, 3675, 3676, 3677, 3678, 3679, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 3687, 3688, 3689, 3690, 3691, 3692, 3693, 3694, 3695, 3696, 3697, 3698, 3699, 3700, 3701, 3702, 3703, 3704, 3705, 3706, 3707, 3708, 3709, 3710, 3711, 3712, 3713, 3714, 3715, 3716, 3717, 3718, 3719, 3720, 3721, 3722, 3723, 3724, 3725, 3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3779, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794, 3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3822,

that American character was betrayed by the Admiralty and a man in prison was strangled like Jesus upon the cross. In May 1914 when Jack Sargison or Michael charge of the *Maile* he was apparently promoted to the rank of Fleet Surgeon for conspicuous professional merit.

#### The Antarctic

The last original article in our Journal was entitled *The French Antarctic Expedition 1908-1913* by Staff Surgeon E. L. Atkinson R.N. The first five pages are concerned with scientific matters, medicine and geology, clothing, the latter still in one article today.

The article was largely a matter of experience, and said more story than any other kind of journal. The following were found to be of the greatest interest for women and women with a pair of stockings of fairly thick material covered everything and up the arm and passed at their position to prevent their falling down. They reached half way down the finger and the thumb was in a separate compartment. Over these were worn a pair of very light material over the compartments for the fingers was single and there was a separate one for the thumb. The men wore no shoes as it is they only extended to the front end of the arm and the hand, meaning that even when they were frozen the hand could be easily slipped into them. Men and a padding of wool could not be done with in frozen. It was also possible through these light socks as they then quickly had to handle the ropes when working in ice. Skates in some conditions were very sufficient but certainly not very useful as a pair of the men in three upon the skates and in pairs and the fingers were in a separate compartment. They were suspended from the neck by means of being with in it to be always ready for use of need.

Following a series of syndromes, vaccination and waiting of the first was one on the health of the party during the winter including observations on the effluence content of the blood. These are recorded in the text against the members of the party by name including such names as Captain Scott, Lieutenant Brown, Green and Dr Wilson. I am sure no clinical committee would allow such today.

#### Canadian Chief

French hospital articles deal with the case of war casualties. Wounded treated at the Royal Naval Hospital Stanley by Fleet Surgeon C. L. W. Bennett, M.D.C. The Royal Naval Hospital Stanley by Fleet Surgeon W. K. Hopton. Wounded treated at the Royal Naval Hospital Chatham by Fleet Surgeon W. G. Ashford, part of which concerns cases received from ships involved in the naval war action, and Wounded treated at the Royal Naval Hospital Plymouth by the medical officers.

Fleet Surgeon M. L. B. Reid's comments on the transport and treatment of wounded in the hospital ship *Flora* continues.

Two ships were made from Calais to Southampton with Belgian soldiers and two ships from Dunkirk to Cherbourg with French soldiers. No wounded were being conveyed by the hospital ship *Maile*. Some of the wounded were very slight but the majority were of considerable severity. These conditions appear to be caused by the large number of injuries, more numerous than at the war. The position of these patients is stated to be due to the intense coldness of the land in Belgium and France which would seem to them with various British emergency expenditure and other measures given in a number of days out of the and the soldiers stand for hours and sleep there for three sleeping holes and one and occasionally the skin of their hands and feet under their armpits.

injuries sharpened by the severity of the assault on someone and it was to be expected as it occurred with the best of shock but there was however a much less cruel reality. This was caused each one of the innocent Japanese and killed when in some cases were given together.

There two operations performed on board are briefly described.

*Surgeon A. Vassilios Elder RNVR presented Paper on Ambulance Tents and Description of Naval Tents No 1*

*The Naval Ambulance Tents No 1* is a part of the Medical Transport System organized in the Navy Command by Surgeon General Sir James Porter RCB RN and consists of 11 coaches belonging to the London and North Western Railway. They are on the carriage plan throughout including the guard's locomotive at each end. Coaches come from the depot at various times up to fifteen a period a day and return comparatively considerable number two are ready a day month three or four but a new coach is withdrawn with during return a fairly small and finally a period a day.

The capacity of the train was given as 120 cars and 72 men. In the first three months of the war the train worked 2241 miles carrying 1794 cases (795 RN 499 Army 428 British and 15 German).

Radiology also has a place among the original services with *A Simple Medical of Evacuating Patients* by Surgeon S. R. R. R. Radiographer RNM Portsmouth.

*Medical Organization for Action*

Three papers were concerned with this subject. One was a report on a study by R. Thompson Medical Inspector Imperial Japanese Navy entitled *Evacuating Patients on Naval Ship in War-time*.

In the latter workshop mentioned previously without previous for a special dispensing system at a fixed place and the position of a temporary dispensing

system has been shown for on the way of an action or emergency. This during the Chinese Japanese War of 1937 and 1938 the Japanese workshop and the officers' workshop as a dispensing system and many in its capacity in the face of the enemy the three had her dispensing system described in the beginning of the battle of the Yalu. The same method used and all their who were at that moment in the workshop were killed or wounded. In the course of the war with Russia remembering that dispatches were sent and sent finally did to clear such exposed positions in the officers' quarters for the position of dispensing system but no the company in that position better adapted.

First Surgeon Ross, writing of the experience in a King Edward VII Class per dreadnought battleship, considers the permanent changes and more required in the action for dispensing stations which were situated behind the mainmast. First Surgeon Calhoun tells in detail of the arrangements for dealing with the wounded aboard his ship HMS *Weymouth*.

#### Occupational Medicine — Aviation

No 1 contains the first of the many articles on occupational medicine — *The Flying Service from a Medical Point of View* by Staff Surgeon H. V. Wells RN lately in medical charge at Eastchurch Flying School. The paper continues:

Great advances have been made both in the staff of the police and in the actual machines during the past 12 months. The speed of airplanes has greatly increased, chiefly as a result of engine power, but partly also due to the design. There is no doubt that the airplane today is a much safer machine than that of 12 months ago. Deadly dangers have been more or less eliminated and the complete work through out. Formerly a great many of the airplane accidents were caused by the

perhaps in some position, usually the cargo and simply as a seaman. The reason for his quick rise, according to the accounts that he never being so far as can be gathered from inquiry, due rather to his constant playing the acephalous and apomorphous or in some cases under pure of his job. Both these causes apparently will remain, but the increased speed and available counter was the loss of control from the power unit. Even so the part of the job will probably be further guarded against in a certain extent by suitable arrangements which will show the flying state of the aeroplane and in case a dangerous condition.

On the subject of physical requirements of candidates for the flying service he writes:

The candidate must be physically fit and I would reject the nervous type. Nervous inhibition must be paid in complete full normal vision and colour vision is required. Hearing must be good. The eardrums must be in good condition. Weight does not matter.

The reason for good hearing is stated somewhat later in the paper:

This must be good as any degree of deafness in the ear gives fine indication by sound. Failure to accurately detect by hearing any engine defect may lead to serious accident while flying.

#### Control of Infection—Typhoid

Major Sirgeon F. W. Russell Smith wrote on Typhoid and its Prevention and the efficacy of vaccination. Also on a Typhoid Carrier by a young Sirgeon was also printed. He came to become Sirgeon Vice Admiral Sir Martin Dudley R.N. His contribution is a very beautiful description of public health measures with:

Between April 1911 and March 1914 HMS Pembroke also serving in the Home Fleet, received 25 cases of typhoid

After a season when other ships were certificate-free from the disease. One case had the following features. During October 1911 he was sent to HMS Pembroke with a few other crew. In 1912 he had dysentery on three but no other effects more than. He is a strongly built, big man, 37 years old. He has no signs or symptoms of gall bladder disease or any other trouble. His rating in the Navy was ship's cooper and his work elsewhere, brought him in contact with articles of food and in opening tins and cases to move the plugs forward in serving out these articles in the crew. In the tins, before a lot of ships in which he served the first on which he joined cook and the cases of various fresh ingredients delivered in small quantities. This lot is sampled from an

No.	Age	Sex	Rank	Service	Date of Onset	Duration	Remarks
1	25	M	Ship's Cook	1911	10 days		
2	25	M	Ship's Cook	1911	10 days		
3	25	M	Ship's Cook	1911	10 days		
4	25	M	Ship's Cook	1911	10 days		
5	25	M	Ship's Cook	1911	10 days		
6	25	M	Ship's Cook	1911	10 days		
7	25	M	Ship's Cook	1911	10 days		
8	25	M	Ship's Cook	1911	10 days		
9	25	M	Ship's Cook	1911	10 days		
10	25	M	Ship's Cook	1911	10 days		

examination of the medical records of the ship. But even before the work is commenced up the journal also has been noted in the table. The exact date of onset distributed amongst many hospitals all over the world during the table is probably very incomplete in regard to deaths and it is more than likely also that the actual number of persons in under-notified cases of typhoid fever may have been missed amongst such cases as simple untreated fever and pyrexia.

"And now the remains Kabla loved from her

Accented words prophesying war"

Coleridge—Ralph Rides



then was clearly after emerging from their original berthing in a shipyard at Sunderland or Newcastle.

I recall one early case that distressed the rather primitive medical and lack of training of the regular naval medical officers of the period. They seemed to be preoccupied with the possibility of a big naval engagement involving many casualties, a circumstance that never arose during the whole six years of war. This concept was on a par with their lack of young doctors in every detachment or ship and inevitably depriving junior medical personnel. When a patient with diabetes mellitus was received I found there were no facilities for weighing food so that it was useless to attempt any control during. When I completed the customary M 21 a small half liter measured for making requests to the Admiral and senior officers, requesting then a pair of cholesterol weighing scales should be purchased for the hospital. This was met with a peremptory, "No, not approved. If scales are to be weighed, the postmaster's scales are to be used. My response to this abrupt decision was to instruct my petty officers not to be too curbed with the postmaster's scales and to report to me if by chance they got broken! While there seemed to be great enthusiasm for dental of a postmaster and underpostmaster level, no provision was made for the training of the sick berth attendants, the majority of whom were ex colliery workers from South Wales and Yorkshire. There was no post-hospital on the hospital and it was expected that I would be able to cover this aspect as medical specialist, but it was the PO already mentioned who enthusiastically set about preparing a small laboratory where, on the strength of a microscope borrowed from RNVR Plymouth we could carry out limited tests.

At the time I was interested in methods of weighing the receiver and instead of some having noticed that many of the patients were passed on regarding food regulations, my PO quickly set about carrying out routine

urine tests in all new patients and we discovered a general deficiency of vitamin C which prompted me to include a statement on the subject in my quarterly reports as medical specialist. On another occasion the hospital had a visit from the MEDCON, a man fellow and a great comrade. While doing a round of the hospital he insisted on having my opinion as to what we required. I pointed to immediate facilities for blood transfusion which he approved, although the Admiral was of the opinion that the possibility of bombing or the creation of multiple casualties at home was unthinkable and that the need for an emergency procedure such as blood transfusion would never arise! I also attempted to get permission to quote measurements for myself and the subject I specialised where we could conduct examinations, in privacy. This was particularly important as it was obvious that many of the patients suffered during the phase of the war were psychomotoric in origin and careful assessment was required in order to avoid more accidents.

This Devon Abbot was a disheartening place in which to find oneself working in such a junior capacity with little opportunity of practicing the kind of serious medicine to which I had been accustomed in the Royal Fleet, but together with the mediocrity of my pay made life very difficult that first winter. I felt that I was sitting away my time in a safe zone while big events were being enacted around me in which I was playing no part or, at the most, a very minorable part. I tried to get a non appointment work as PMO to a battleship but these posts were all held by RN Surgeon Commanders. No offer came for a hospital ship and in any case apart from satisfying myself as being able to claim that I was at least not going, such a post could equally well be filled by a first class man. While rumours were spreading, nobody was prepared to do anything and it seemed to be admitted that the post was RNVR members was at a double stage level.

medical consultants being appointed almost entirely from amongst the officers, rather than the Reserve. Some of them had no doubt acted wisely in ignoring the professional mobilisation order applying to all reserves, sitting back until they were eventually appointed surgeon captains and entered the Navy as a truly permanent role. Two physicians of my acquaintance, neither with any previous connection with the Royal Navy, entered as surgeon captains being appointed consultant neurologists and consultant psychiatrist respectively both splendid choices as it happened it was noted to them that I was languishing in the backwater at Newton Abbot and who's next have been set on motion for by the following year (1961) I had been transferred to the RM Auxiliary Hospital, Ramsgate, Gurney, which was rapidly becoming the neuro-psychiatric centre for the Royal Navy. I felt I could be of real use as such an appointment and could at least expect to continue my long-standing interest in psychology.

The clinical prospects for medical specialists at Newton Abbot were have been recognised by the Medical Department for I was replaced by a young man of about 32 who had been in general practice and whose only qualification was an MRCGP. However, Newton Abbot did give me the opportunity that I had long sought of learning to fish. Serving officers were granted the free use of the Emsay Creek-shore river, the Dore, the Tyne and the Tyne, and during that first year, when there was so little to do medically, we spent much of our time on the water. It was on the Tyne that I caught my first sea trout and acquired the technique of fly fishing.

Another interest which made my time at Newton Abbot bearable was my meeting with an old man of 75 who had been an establishment on the staff of the Montreal General Hospital and who was now living in retirement with his wife, the being an exile from the Suez Canal of

Cairo, Washington DC. I used to visit there two days a week, one week, on taking my plane to write a book on "The Suez Channel" and discussing with him consequences I had made to the *Journal* on the subject of paper alone in the Royal Navy, which was then president both in the Navy and the Army. I also wrote a short article on a new disease in which was that had previously not been recognised — blue injury to the lung. This was something of which we had extensive first hand experience when HMS *Fighting*, an anti-aircraft ship was attacked in Portland Harbour and sustained heavy casualties, all of whom were brought to Newton Abbot. The surgical specialist adopted new ideas in the treatment of the numerous burns sustained by many of those patients and assisted me in educating the nursing staff in the final requirements of the badly delayed patients including those with crushed limbs.

#### **Royal Naval Hospital, Ramsgate, Gurney**

Ramsgate, Gurney, a new hospital opened within the previous twelve months and originally founded as a mental hospital for the city of Bristol, was built on a corner of parkland and had extensive grounds surrounded by pine forests. It was a training centre for sick leave and plans, and there I found an entirely different atmosphere pervading stretching from the Surgeon Rear Admiral downwards. Two hundred and fifty beds were set aside for psychiatric cases, and there was a preponderance of psychoneurologists among the medical officers. I was put in charge of the neurological ward which had some 40-50 beds and comprised cases transferred from other hospitals, both at home and abroad. I attached myself to the Consultant Psychiatrist for instruction as I found I knew comparatively little about the subject and directed attention to reading some of the Surgeon Lieutenant who wanted to get their friendship. The numerous psy-



change sympathies held between members of the staff remained my interest and with the aid of extensive reading much of it done during the many journeys on Admiralty business. I successfully ran for the DPM Eng in 1944.

While I was at Ramoey Quay HMS 470 sent for me to discuss the problem of sailors with peptic ulcers who were being disabled out of the Service at a time 1941-42 when the manpower shortage was beginning to be felt. He wanted me to take on the job of arranging for men with experience to have special facilities allowing them to return on dockyards or even ships but under conditions of home and shore service. A word would be set aside at Ramoey Quay for such cases and it would be my responsibility to decide whether a man was suitable for this type of service or whether he should be disabled. I would be granted leave of absence to investigate the prospects of establishing quarters for these gastric cases at a suitable shore base. I made my visits to Belfast, Harve, Plymouth, Portsmouth, Liverpool, Liverpool, Belfast and Londonderry. At this stage I began to appreciate the difficulties of maintaining such a naval plan in a conservative society like the Navy where only conservatism was "fit or not fit". Rightly or wrongly I felt certain that the men with peptic ulcers should not and need not be disabled. With reasonable dietary conditions regular meals and medical care, I considered that he could perform a useful service in the RN in his particular category. However opposition to the establishment of the centre prevailed and as the naval base I visited it was perhaps strongest among the physicians who feared all manner of so-called difficult diseases would be serious for the gastric cases numbered 100, the men were retained in hospital to ensure their absolute fitness for draft when the time arrived. The result came with a visit to Commander in Chief Western Approaches. It was not that

meeting and he proved sympathetic from the start saying that I should have approached him at the outset rather than dealing with Paymaster Commanders and the War. Discussing my idea that I should return to Ramoey Quay where I was, after all a medical specialist he wanted me to accompany him on a journey from Liverpool to Britain. We flew in a small naval aircraft landing at Eglinton near Bury and proceeding to HMS Forest, the big naval barracks at Londonderry. He was faced up all difficulties and while HMS Forest was turned over for the reception of gastric cases. We flew then to Belfast where, researching my local approach, he arranged for HMS Donegal to be taken over as a gastric centre. Goodwin a diastolic figure reported under the latest local programme was being alongside the dockyard wall idle and without a crew. The entire ship's company from the wall in



The Distinguished Service Medal — awarded to Surgeon Captain Atkins at the end of the war by his ship's doctors in Belfast at the ship's company of HMS Donegal. It shows various stripes which had had his ship's doctor off but was otherwise unimportant. Awarded in the Service's House of Belfast who was awarded by naval ratings supporting their people who had worked in the dockyard for years and years.

the gallery to the medical officer in charge had all other endogenous operations, laparotomy, polypectomy or proctocolectomy or removal treatment for haemorrhoids or melanoma all were employed in their different guises, on the signal department locally in small boats around the harbour or at stations in ships coming in from sea or on further deployment. At this point the Admiralty recognised the need to promote our Surgeon Captains and to appoint our Medical Consultants or Warrant. Approaches with my headquarters at RNH Plymouth where I was also appointed NMOB, the first RNFR officer to be so appointed. I continued to visit the prison canteen in Dartmouth and *Parus* regularly until the scheme was finally abandoned with the conclusion of the war. This embroidered medal was produced by the man as a generous tribute to the benefit they had received.

#### **Royal Naval Hospital, Plymouth**

In the autumn of 1964 I joined RNH Plymouth to take charge of the medical division taking up one of the official residences in The Square or Southdown where I was granted a Green and as an Marine permission to look after the garden. The two years spent at *Parus* Guttery is an atmosphere of almost exclusive neuropsychiatry but of course from a more personal viewpoint providing me with the opportunity of meeting my old acquaintances of the three current consultants who were permanently attached there. It had enabled me to take the DPhil and to qualify as a psychoanalyst largely self-taught neuropsychiatrist. When the Consultant Neurologist, to the Royal Navy undertook a tour of Far East naval bases, I had assumed his duties and travelled widely within the UK, to see various neurological cases. One of these was the First Lord of the Admiralty Sir Dudley Pound. There has subsequently been considerable psycho stimulation on his tragic case and notably

notably I did not have the opportunity of seeing him as he was practically paralysed when the request came. However, having spent nearly five years from 1939 to 1942, in comparative silence and without the satisfaction of any service joining RNH Plymouth as a Surgeon Captain found me with great joy now I could make my voice heard and be of some use medically or psychologically.

On one occasion we received a sudden and unexpected visit from the last Member of Parliament Lady Aneurin, a vibrant personality. She called on the Admiral on his way back to Plymouth to suggest that he should do something for Sackler Dock in surgical ward so and so on, in her opinion, he was very depressed and likely to prove suicidal. Both Surgeon Captains were committed to the Admiral but before any action could be taken it was reported that Sackler Dock had attempted to cut his throat with a razor thus proving the medicolegal benefits to be derived from having an acknowledged MP looking over one's shoulder!

I having friendly with Lady Aneurin and mentioned the old fashioned arrangements which prevailed in the hospital kitchen in regards the patient's diet. The last meal of the day was served at 4.30 pm at the latest after which they were not permitted to receive anything until the following morning. This was an unforgettable hardship in response to so many largely able bodied young men and Lady Aneurin promised to do something about it. I thought on more of the matter until a fortnight later when I learnt that we were to receive an official visit from the Second, or at most have been the Fourth, Lord of the Admiralty. I phoned questions as to what had prompted the official visit and on the day in question mentioned the concerns earlier when the guest came as part of his inspection demanded to see the gallery where he encountered the Chief Cook and his suite. The net result was that on future meals were served until a much later hour.

to the great satisfaction of the patients.

One of my duties as MDCM was the care of the Polish Navy who had their head quarters in a ship near Yelmina. There were at least half a dozen warships moored nearby by the First Polish Navy and their sick ratings were attended to RNVR Plymouth. I took this duty very seriously studying their case records and questioning them if necessary with the aid of an interpreter to ensure that they were truly fit for duty. By and large they were a most impressive body of officers and I recalled that one of their number - a leading surgeon called Peter Szabo, had been a prisoner of Maxton Abbey. He had had a large porcelaineous discoloured stain which had penetrated the ribs and prob of a gastric ulcer before and had died despite our utmost efforts. Poor Peter Szabo! He could not return to his own country which was then under Russian occupation and had no news of his wife and children. Probably no man in the whole war effort did as disloyally as did he.

At the conclusion of hostilities, as my time for demobilisation approached, I was privileged to be invited by the senior Polish naval medical officer in a ship in my home on board the destroyer *Scout* the same morning a hurricane in a gale state. I was exceptionally glad over the ride to find all the officers assembled in the wardroom where a balustrade, wrongly placed. On another occasion at a party to the Polish headquarters where I was made a member of the 'Brotherhood' in a ceremony which involved my finger being dipped and my blood offered to mingle with that of the others present.

One interesting aspect of my appointment was attendance at the regular court was held at the Medical Department with MDCM as attendance. Consultations were now used to appear there now as administrator and other matters, the Surgeon Rear Admiral in respect of surgical matters took a prominent part but the medical members of the board

were much less contributory. I remember particularly the opinions of Anzani and discussions to members of the RNVR being raised. These seemed to be spread in the Court but MDCM pointed out that the Navy was very conservative and made such awards only for conspicuous gallantry in action. Another point raised was the posting of RNVR officers in relation to their level of an academic background. For example, this RNVR officer well known for his standard contribution was entered as a Surgeon Lieutenant and might well have remained in that rank had his rise not been brought to the disattention of MDCM. As a result he was promoted to temporary Surgeon Commander. More important was the position of young temporary RNVR officers who were left in destroyers and other small craft for two or three years when there would have been great reason for getting them a spell in one of the naval hospitals and using our special ability, such as a knowledge of a consultant.

My own work at RNVR Plymouth was largely administrative and two very able Frig Officers helped me to avoid the sort of gaffs which a relatively inexperienced administrator might make in a complicated organisation like the Navy. I particularly remember one such occasion. As Surgeon Captain I had to see all ratings due for discharge with a view to those commencing their home duties. The patient in question had sustained a very severe head injury but from thought to be malnourished and had been introduced to the so-called 'interdependency group' at Plymouth near Plymouth. There he had finally been recommended fit for duty nothing abnormal having been found to explain the handicap of which he complained so vociferously at sea. When I saw him I was impressed with his non-nervous behaviour and the fact that on brief examination there was slight stiffness of his neck. I refused his discharge not being satisfied with the *acute de novo* diagnosis of malnourishment and showed the medical

specialist to do a tracheal puncture to exclude the possibility of subarachnoid haemorrhage from a ruptured aneurysm. However, one hour later the patient suddenly died having passed into deep coma. At post mortem a large subarachnoid haemorrhage was found at the base of the brain extending over most of the cerebral surface. His death was inevitable but had he been discharged and died some hours later the Admiralty would have been open to previous legal for malpractice or negligence.

I was able to stand at another occasion when some Free French troops, the crew of a tanker, were admitted with obscure signs pointing to viral infection. They also had chest signs and all were desperately ill, rapid and before they condition was recognised as rickettsial poisoning. Having a night in port, they had decided to clean their uniforms and had used the powerful drug for this purpose afterwards hanging up the uniforms in their cabins in day. This alone was dangerous but the hazards were increased when they consumed a heavy meal of pickles and fish coupled with a good deal of alcohol before retiring to their bunks for the night.

While at Plymouth I also took part in experimental work in the Naval Medical Research Department in connection with devising breathing pure oxygen which needed to put out six litres per min. and in studying the effects of decompression and the breathing of the atmosphere, pressure EEG readings were taken while the man remained in a compression chamber for several hours the pressure in the atmosphere being first raised and then lowered and the reactions of the man studied clinically in a similar manner. I investigated the possibility of headlands of survivors being assisted by symptoms of pressure. Thus at first fully informed the subject was that when they entered a lifeboat they should each have an intranasal oxygen with the object of preventing the retention of body fluids and

retarding the onset of dehydration. However while a good theory it did not work in practice no difference being noted in the volume of urine passed.

By the end of the war I had collected some 100 cases of head injury, a many which by far the most interesting was that of a young Army lieutenant who was injured severely by an at Plymouth. He had been shot through the left side of his skull and contained a permanent night-vision lens, being largely inoperative and quite opaque the many months after his wounding. A curious feature was that while he could at first only haltingly remember his injury was extremely good at that he could learn the letters 'a' and 'b' and 'c' and 'd' and 'e' and 'f' and 'g' and 'h' and 'i' and 'j' and 'k' and 'l' and 'm' and 'n' and 'o' and 'p' and 'q' and 'r' and 's' and 't' and 'u' and 'v' and 'w' and 'x' and 'y' and 'z' and '0' and '1' and '2' and '3' and '4' and '5' and '6' and '7' and '8' and '9' and '10' and '11' and '12' and '13' and '14' and '15' and '16' and '17' and '18' and '19' and '20' and '21' and '22' and '23' and '24' and '25' and '26' and '27' and '28' and '29' and '30' and '31' and '32' and '33' and '34' and '35' and '36' and '37' and '38' and '39' and '40' and '41' and '42' and '43' and '44' and '45' and '46' and '47' and '48' and '49' and '50' and '51' and '52' and '53' and '54' and '55' and '56' and '57' and '58' and '59' and '60' and '61' and '62' and '63' and '64' and '65' and '66' and '67' and '68' and '69' and '70' and '71' and '72' and '73' 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# LETTERS TO THE EDITOR

## Computer-aided diagnosis

Sir

I have received further correspondence on the use of computer diagnosis systems for abdominal pain in ships and submarines and believe that my previous letter (Spring 1982, p. 441) requires slight amplification.

There is most probably little justification for using these systems in submarines carrying medical officers. There may however be a strong case for using such systems in ships and submarines not carrying medical officers. Whether the treatment/management and outcomes of the Fleet might have been altered and a saving of life or money might have occurred is currently under active study at the last stage of Naval Medicine by a research medical officer. In addition, the LHM system is being prepared for evaluation.

I am etc

J. R. Harrison

Sergeant-Commander RM

Adjunct to Submarine Medicine in Flag Officer Submarines

Rehabilitation after injury

In his recent paper (Rehabilitation after Injury, Spring 1982, p. 461) Lieutenant F. Reed MScP RM excellently made his point for early rehabilitation. However, I must give the record straight!

In his historical perspective Lieutenant Reed says: "As often since the history of physiotherapy put in wounded gymnasts was not known". On the contrary the Orthopaedic Rehabilitation Centre at Broadley House, the first of its kind, was started by Sergeant-Commander Pearson RM and a physiotherapist. Indeed, a physiotherapist was always in attendance during an examination and I myself served there for a time. We helped to keep the physical training instructors in orthopaedic techniques, and at least two

of them undertook some months training at Pinderfields in quality physical gymnastics along with RMP and Army personnel, and originally from the Society. I well remember how keen they were to learn and how good at organising all kinds of outdoor exercises — no one wanted, not even physiotherapists who might have been hot on red and blue light torches. Lieutenant Reed says "the rehabilitation proved effective" — I agree because I was there and saw the practical results.

If a goal is to bring all the up-to-date orthopaedic departments in both naval hospitals and that the Joint Naval Medical Rehabilitation Unit at Chesham and Broadley House now only deal with the most severely injured.

I do hope Lieutenant Reed will see that the contents of his otherwise excellent paper have not, but we need blue light torches as well.

I am etc

C. B. Howie

Lieutenant CPOMA

Sir

Thank you for asking me to comment on Mr Howie's interesting letter. I am grateful to him for putting the record straight regarding the staff at Broadley House, the presence of physiotherapists on ships, reduced the effectiveness of the rehabilitation regime.

Mr Howie appears to have taken my reference to "hot, red and blue lights" as a bit out of context. There was no intention to suggest that the physiotherapists were any less able, but that the treatments employed have over recent years been reduced more drastically and some of the more treatment regimes abandoned as a result.

I am etc.

F. Reed MScP

Lieutenant RM







**APPOINTMENTS**

**As Medical Officer in Charge, Royal Naval Hospital, Gibraltar and Staff Medical Officer in Flag Officer Commanding on May 28, 1951**  
*Superintendent* L. H. Harvey

**As Medical Officer in Charge, Royal Naval Hospital, Plymouth on July 26, 1951**  
*Superintendent* T. D. W. Neill

**As Medical Officer in Charge and Director of Research, Institute of Naval Medicine on August 1, 1951**  
*Superintendent* R. F. Bell

**NEW APPOINTMENTS**

*Superintendent* J. H. Macleod, *Comptroller* R. J. Gillingham

**RE EMPLY**

*Superintendent* R. F. Kelly

**TRANSFERRED TO FULL CAREER**

**COMMISSION**

*Superintendent* H. E. Roberts R. C. Evans  
*Superintendent Comptroller* R. W. M. D. Davis  
*Superintendent* R. J. Kelly  
*Superintendent* R. E. T. Roberts  
*Superintendent* R. H. Roberts

**TRANSFERRED TO FULL CAREER**

**COMMISSION**

*Superintendent Comptroller* R. W. M. D. Davis  
*Superintendent* R. J. Kelly  
*Superintendent* R. E. T. Roberts  
*Superintendent* R. H. Roberts

**RETIREMENTS**

*Superintendent* H. E. Roberts R. C. Evans  
*Superintendent Comptroller* R. W. M. D. Davis  
*Superintendent* R. J. Kelly  
*Superintendent* R. E. T. Roberts  
*Superintendent* R. H. Roberts



*Superintendent* H. E. Roberts R. C. Evans  
*Superintendent Comptroller* R. W. M. D. Davis

The following appointments have been made by the Admiralty in the Royal Naval Hospital, Gibraltar and Staff Medical Officer in Flag Officer Commanding on May 28, 1951. The following appointments have been made by the Admiralty in the Royal Naval Hospital, Plymouth on July 26, 1951. The following appointments have been made by the Admiralty in the Royal Naval Hospital, Plymouth on July 26, 1951. The following appointments have been made by the Admiralty in the Royal Naval Hospital, Plymouth on July 26, 1951.

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**ROYAL NAVAL RESERVE**

**RETIRED**

*Superintendent* H. E. Roberts R. C. Evans  
*Superintendent Comptroller* R. W. M. D. Davis  
*Superintendent* R. J. Kelly  
*Superintendent* R. E. T. Roberts  
*Superintendent* R. H. Roberts

**MEDICAL SERVICE OFFICERS****INCHON**

Acting, Reader of the Royal Naval Medical Service / 10  
*Admiral's Secretary*  
 Lieutenant-Commander H. I. Murray

**PROBATIONERS**

The Assistant Commandant  
 C. L. Jones

**Training Staff Officers and**

R. A. Edwards D. J. Longley A. P. Jones

**DETACHMENTS**

Lieutenant-Commander D. M. C. Page MBE  
 Staff Nurse Mary Collins RSCD (Staff Nurse)  
 Captain P. Dorell  
 Staff Nurse Adams

**QUEEN ALEXANDRA'S ROYAL NAVAL  
NURSING SERVICE****INCHON**

Strong, Sister of the Queen Alexandra's Royal Naval  
 Nursing Service  
 Sister M. Spryngal

**PROBATIONERS**

The Superintendent Sister  
 Miss A. P. Smith M.C. R.N. Sister

**Training Staff Nurses**

Miss M. M. Cunningham M.C. J. (Sister) Miss M.  
 C. Martin, Miss L. J. Martin MBE, Sister Miss L.  
 A. Smith

**ILLUSTRATED POINT RECORDS**

Miss S. M. C. Taylor Superintendent Sister



On March 19th the Royal Navy Operational Medical Service at Inchon was presented with a presentation by the United States Government. Capt. A. J. Jones, Captain-Commander of the British 10th Medical Battalion, the United States Officer, Mr. H. H. Hensley, Surgeon General, United States Department of the Interior, and Captain J. H. Hensley, United States Department of the Interior, presented the presentation.

Staff of the Royal Naval Medical Service at Inchon, Korea, 1947. (Left to right) Captain J. H. Hensley, Surgeon General, United States Department of the Interior, and Captain J. H. Hensley, United States Department of the Interior.



Staff of the Royal Naval Medical Service at Inchon, Korea, 1947.

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# WELCOME HOME



The transport ship *Minerva* returns to Southampten from the Falklands on August 1 after a round trip of some 31 000 miles. The medical party, which flew out to join the experimental educational cruise ship in Gibraltar in April, comprised 11 medical and one dental officers, two Medical Services officers, 13 QUARRIES nurses, 24 naval nurses and 14 Medical Service ratings, and during the 113 days at sea they received 738 casualties.

## Editorial

Many readers may be surprised and somewhat disappointed that this issue is not concerned with the medical aspects of the Falklands Islands conflict. However such a publication would pre-empt a symposium on this subject to be held on February 17 and 18 at the Royal College of Surgeons in London. It is hoped to publish the substance of the symposium in the Spring 1982 issue of the Journal.

Revisiting back through past editions it became apparent that, while there were several concerned with the training of medical officers, very little has been said on the training of medical assistants. It therefore appears to consider some aspects of their training. I do this unashamedly since I believe that the MAs Branch is vital to the Royal Naval Medical Service in the performance of its varied roles and that the single-headed UMA on a frigate has one of the most responsible tasks at sea.

The numerous medical assistants was present working in all areas during the recent conflict in HM Ships large and small, ashore with the Commandos and with the USMT in San Carlos Bay, on the hospital ship *Albatross* and the casualty evacuation ships and in the RCNs and merchant vessels. His role varied from being the only medical support for a company to some specialized roles with the Surgical Support Teams or in the hospital setting.

How does management fit this part of the job? It is a delicate task, ranging from the heavy responsibility of sick medical changes and the more 'paramedical' techniques to the

need to undertake in the more specialized activities in the operating theatre.<sup>1</sup>

Medical assistants learn their skills in the Royal Naval Medical Staff School, in the Naval Hospitals and in the Fleet. None of the universities can take over the training tasks of the others and all three areas are indispensable for the full and varied training required. One thing is certain, no course can with comparable studies can be found in civilian life and I am sure that MAs cannot be trained outside the Service nor in a school like the Naval Hospital.

Surgeon Captain Oliver, later in this issue, quotes the views of the Medical Inspector of the United States Navy in 1915 questioning the need for hospital specialists in the USN. The Medical Inspector argued that the Naval medical effort is a specialist in the highest sense of the word and that hospital and hospital ships should be staffed with specialists from the ranks of the regimen — the implication being that they would be available full time only in time of war.

While I am certain that the maintenance of a strong and active reserve willing to place their high skills at the disposal of the Service is absolutely vital to our ability to fulfill our roles both in peace and war, I am equally sure that we must maintain some Naval Hospitals manned by serving personnel containing a wide spectrum of disciplines, with Basic, Accident and Emergency Departments and with the necessary range of patients. Only then can we provide the experience, knowledge and breadth of

mountains? For some thought is due.

Attendance is estimated to be a comparatively small problem, in that not more than 75 students are devoted to a 1st Part II training, and that knowledge is repeatedly tested in their qualifying examinations. At present there is probably insufficient further training in casualty care unless the medical assistant (MAs) too gain leave when prior to arrival with a Certificate to undertake the Advanced Casualty Care Course run by the RN Medical Staff School. Apart from discussion with them as to suitable specific attachments, to the Naval Hospitals to learn to manage the emergency patient, to continue to put up ships to undertake plaster work and to work in Accident and Emergency, and in the Hampshire Ambulance Service to meet both road traffic accidents and other emergencies. The course has proved of exceptional value but the numbers that can be served are limited by the facilities that are available. It is proposed to have a separate Casualty Care module in the Leading Hands Qualifying Course which will be tailored to the specific needs of our branch: practical procedures may prove a difficulty but not up all our RNR

counters—there have suffered mountains—and this will help to spread further the benefits between the branch and the reserves.

By far I have written only of training and the high professional standards to be reached and maintained but we must be careful as the hospitals especially not to forget the quality of life we allow. Medical students in rotation with all Services pass the Season for a diversity of reasons. Loss of the Royal Navy and the quality of life it offers must be high on the list as must the camaraderie, the tolerance (judicially less than of civil) and the opportunity for sport. I believe that we do not encourage sufficiently those reserves that go to improve the quality of life and that if we fail to do so we shall not attract the right type of person to fill the medical support structure.

I have written of medical students, but they are only one part of our branch and much of the above applies, to all other sections, at present mainly for us, even though we are all one and that the branch can only function effectively if we all pull together and work unobtrusively for our patients, the Royal Navy and the branch.

#### LETTER TO THE EDITOR

Sir,

I think it is not widely known that during the recent Falklands campaign the Royal Naval Reserve medical officers provided invaluable support to the RN Medical Service, particularly in the two naval hospitals. RNR officers made themselves available immediately as a voluntary training base commencing in April and extending well into July for the purpose of Operation Corporate, and they are continuing to make themselves available for recalls to service as that medical officers returning from the South Atlantic may take much needed leave.

A total of 41 RNR medical officers from various specialties were recalled to service for two week periods on a rotational basis, often at very short notice with varying degrees of disruption within their own practices and often at a loss of salary with some actually forgoing family holidays.

The RNR continues to support the RN Medical Service with very highly qualified and competent doctors who are enthusiastic RNR members.

I am Sir  
S. P. Thomas, CPOMA,  
Assistant to Staff Officer  
Medical (Reserve).



## Malignant Melanoma Presenting as a Case of Adult Intussusception

S. D. Ghossein and E. F. Desai

### Abstract

*A case of malignant melanoma presenting as adult intussusception deserves? The difficulty of diagnosis and poor prognosis are discussed. Despite surgical treatment it ultimately succumbed.*

### Introduction

Malignant melanoma has long been known to metastasize to the gastrointestinal tract and intra-abdominal organs.<sup>1</sup> The development of abdominal symptoms in a patient in whom malignant melanoma has already been diagnosed is often associated with rapid deterioration in the condition. The prognosis of widespread metastatic malignant melanoma is known to be poor. However, in certain cases aggressive surgical treatment of intra-abdominal complications is indicated in spite of disseminated disease and poor prognosis. The case that we describe presented with an acute mechanical obstruction before malignant melanoma had been diagnosed and required urgent operation/intervention.

### Case Report

A previously healthy 40-year-old Lebanese man presented to his sleep surgeon in April 1981 with a three-week history of lower abdominal discomfort and waking in the left toilet. He was treated from the sleep and referred to the UK by his Bureau of passport symptoms he was referred to RMR Haring for investigation. The abdominal pain was worse during the early morning and woke him from sleep on many occasions. The pain was eased by

simple analgesics but not by enemas. There was associated anorexia and slight weight loss but no change in bowel habit. Clinical examination revealed three dark pigmented cutaneous lesions on the right forearm/chest. No abnormality was found in the abdomen but a small left varicocele and a tender enlarged left epididymus were present. The prostate gland was boggy and a post-voiding, discharge and red urine specimen of urine gave *Escherichia coli*.

Subsequent progress was characterized by the onset of vomiting. The vomit was red and altered blood and the patient was treated with nasogastric aspiration and intravenous fluid administration.

Esophageal gastric endoscopy showed only a dilated lumen; home with nasogastric. Plain abdominal radiographs showed small bowel distension with air fluid levels. Intermittent anorexia having previously been reported following the finding of a massive dilatation of a cecal loop occupying lesser in the left half. Fecal smudged blood tests were repeatedly positive.

The lesions of the forearm/chest wall were excised under local anesthesia and sent for histological examination. The web site surgical observation permitted inguinal metastasis "drip and suck" treatment. Three weeks abdominal distension then developed with increasing anorexia. Sequential plain abdominal radiographs showed increasing distension of small bowel.

An laparotomy bloodstained fluid was found in the peritoneal cavity. There was no distal mesenteric mesosigmoid and at the leading point of the mesosigmoid a large 5cm diameter fleshy, intra luminal polyp (fig 1). Other polyps were present throughout the sigmoid and ileum. Mesenteric tissue was present on the anterior parietal peritoneum. Both kidneys were enlarged and the left kidney was opened to reveal a mass like debris within the dilated renal capsule. The mesosigmoid portion of the ileum was resected and fragments of mass of necrosis were taken. The continuity of the bowel was restored.

Post-operative recovery was unremarkable and the patient was discharged 14 days later though he remained anorectic. His abdominal symptoms resolved but he died of disseminated melanoma eight weeks later.

The histology of the biopsy specimens from the intestine chain well showed them to be two mixed pigmented lesions which were primary malignant melanomas of the nodular type. The tumour infiltrated to the level of the muscularis propria (level 4) to reach a thickness of 0.6cm. There was deposition of pigment in the dermis and some accumulation of inflammatory cells on the margin of one of the lesions suggesting necrosis of the tumour and vitelline appearance type area as a thin pigmented area where viable tumour cells were no longer present but residual pigment and inflammatory cells were seen again suggesting melanosis. Sections from the small bowel polyp which was resected showed involvement of the full thickness of the small bowel with tumour— and obliteration of mucosa over the surface of the tumour. The tumour cells had large open vesicular nuclei with prominent nucleoli and abundant cytoplasm were seen. Pigment was not evident on routine sections. An adjacent pigmented area of the small bowel mucosa showed small mucosal hyperplasia with no other abnormality.



Fig 1. A fleshy mass protruding from the end of resected small bowel polyp which presented as an acute intestinal pain.



Fig 2. Small bowel polyp — a melanoma from extensive primary malignant melanoma.



Fig 3. Cross section of small bowel polyp which showed the area of the melanoma mass.

The appearances were reported as those of metastatic malignant melanoma in the small bowel. All eight operative specimens, however, came from the left lobe, from the wall of the proximal small bowel from the ileocaecum, from the wall of the caecum, showed metastatic malignant melanoma with appearances similar to those previously noted in the large polyp.

#### Discussion

Malignant melanoma is an uncommon condition which severely affects life expectancy. 500 deaths per year in England and Wales.

It seems that metastases of cutaneous malignant melanoma to the gastrointestinal tract are more frequent than previously appreciated.<sup>2</sup> Nevertheless such metastases are rare. Das Gupta<sup>3</sup> studied 1,000 consecutive cases presenting with extensive malignant melanoma and found that in only two instances were these metastases to the small bowel. In a series of extensive malignant melanoma involvement of the small bowel has been found in 5.6% of autopsy examinations.<sup>4</sup> Willet<sup>5</sup> analysed the results of 108 autopsies of patients with true histopathologic metastases to the small bowel. He found that malignant melanoma was the metastatic aetiology and accounted for 10% of cases. The tendency of cutaneous malignant melanoma to metastasize to the small bowel without being part of generalized postmortal metastatic involvement.<sup>1</sup>

Diagnosis of cases of small bowel metastases from cutaneous malignant melanoma is difficult in our case it was diagnosed at laparotomy. The preoperative concept of histology of the cutaneous lesion of the appendix also wall in the ileum, previous studies cases of gastro-intestinal metastases have been diagnosed, usually at laparotomy or autopsy.<sup>6</sup> However both

clinician and patient are often unaware of the primary metastases from the diagnosis of malignant melanoma is rarely considered as the primary's abdominal symptoms. An additional source of difficulty in the long disease free interval sometimes seen between the appearance of the cutaneous lesion and the abdominal manifestation. Indeed the symptoms from may have totally regressed by the time that the abdominal symptoms are manifest. Our patient could not remember how long the lesions had been present on the anterior chest wall and it is more had he drawn their presence to the attention of his medical practitioner.

The variety of symptoms also makes diagnosis difficult. The symptoms may include vague abdominal pain or discomfort, gynaecological bleeding or the symptoms of intestinal obstruction.<sup>1</sup> In addition the symptoms associated with widespread metastatic disease may be experienced and further complicate the picture. The triad of abdominal cramps, nausea and vomiting and abdominal distension is the most common symptom complex. However in those patients with malignant melanoma who have symptoms of GI obstruction, intussusception is the most common finding.<sup>1,7</sup> A palpable mass and bloody stools are common presenting features of intussusception in children and children but are rarely seen in adults. There is frequently an absence of peristalsis and abdominal tenderness until the intussusception becomes irreducible, which is usually at a late stage of the disease. The non specific symptomatology and ill defined clinical picture is more probably due to the short duration and intermittent nature of the intussusception in the early stages until such time as the metastatic tumour has grown to a size whereby an intussusception becomes irreducible.

Investigations are seldom helpful. A plain abdominal radiograph may demonstrate small bowel obstruction. Barium meal may



# Investigation of the Abnormal Chest Radiograph

W. H. Edwards\*

## Abstract

Single chest roentgen and chest scans as the abnormal appearance of a chest scan require of the radiologist, as the chest radiograph.

## Introduction

A frequent problem in clinical medicine is the diagnosis of abnormalities on the chest radiograph. While the diagnosis is often easily achieved by a combination of clinical and radiographic findings supported by appropriate laboratory investigations, occasionally other measures, such as histological examination of the lung or pleura, are required. Sometimes these studies are delayed on a routine x-ray in an asymptomatic person (this is particularly relevant in renal medicine where asymptomatic, for example, a peaking above right heart a year in renal radiologic radiography<sup>1</sup> is done) one of the right cases presented here with chest findings in otherwise healthy, and persistent.

The aim of this paper is to present an approach to the investigation of an abnormal chest x-ray. Diagnostic techniques in our disposal are described and the illustrated findings cases seen at the Royal Naval Hospital, Haslemere between June 1961 and June 1962. Each of these cases presented a diagnostic challenge and all but one required some form of biopsy techniques to determine the etiology of the x-ray abnormality.

## Techniques

**Laboratory investigations.** The importance of analysis of sputum, sputa or

emphysis. Visual inspection of sputum for blood, pus, mucus and plugs or bronchial casts is valuable. Staining by Gram or Ziehl-Neelsen techniques followed by appropriate culture for bacteria including acid-fast bacilli should always be undertaken in cases of chest x-ray shadowing of unknown etiology. Cytological examination is also mandatory. Although sputum is usually obtained by expectoration other techniques such as bronchoalveolar lavage, bronchoscopy, biopsy and percutaneous lung puncture may be helpful.

Examination of the blood is of limited value in diagnosis but markers, leucocytes and elevation of the erythrocyte sedimentation rate (ESR) are non-specific markers of disease. An emphysema of greater than 0.5 x 10<sup>9</sup>/l accompanied by chest x-ray shadowing should alert the physician to conditions such as chronic bronchitis, pulmonary emphysema,<sup>2</sup> cysticosis, or drugs such as isoniazid, rifampin, RAC, cephalosporins and amphotericin before the infection, eg. tuberculosis, occurs, tumors and metastases, and finally cryptogenic pulmonary emphysema should be considered. The last condition may develop in children, and presents as increased fitting pulmonary infiltration associated with a high blood eosinophil count. It has also been termed cryptogenic eosinophilic pneumonia<sup>3</sup> and it may be differentiated from other causes of pulmonary emphysema by the history, the absence of

suppurative hyphae in the sputum or suppurative precipitation in the blood, and by normal serum IgG levels and negative skin tests to suppurative fungi also.

Case 1 is a 55-year-old Chinese male presented to him (HSE) with severe acute cellulitis. He presented to him (HSE) at the left 4 weeks of the chest x-ray and a small emphysematous cyst at 1.6 x 1.2 cm. After this increasing this to 2.5 x 1.5 cm with some septa and the x-ray showing nodal emphysematous changes following a course of oral and penicillin. Two months later the chest x-ray compared to chest x-ray from 1978 shows the nodules. These were accompanied by upper lobe cysts and a large collection of liquid along the septa, but there was no consolidation of the upper and lower lung. The patient was given the 1978 x-ray. All these given that the chest x-ray showed a large emphysematous cyst in the left and right upper lobes (Fig. 1) and he had a more emphysematous chest (Fig. 2).

The clinical picture was of pulmonary emphysema, possibly due to cigarette smoking, possibly due to cigarette smoking. The suppurative changes and cystic changes were seen (HSE) in the left and right upper lobes. Other points of pulmonary emphysema such as septal emphysema and interstitial emphysema were visible. There was a diagnosis of pulmonary emphysema, possibly due to cigarette smoking. A further review of the chest x-ray was completed within the suppurative changes and he was given chest x-ray. The chest x-ray was a more emphysematous chest. The chest x-ray was a more emphysematous chest.

Pleural fluid should be aspirated for analysis if a pleural effusion is demonstrated on a chest x-ray. If the serology is not abnormal then pleural biopsy should also be performed. Sufficient fluid should be aspirated for diagnostic purposes or to achieve respiratory distress, but certainly no more than 1000 ml should be removed in any tap. Unilateral pulmonary oedema has occurred when this advice has been disregarded.<sup>2</sup> Cytological examination of the fluid for malignant cells and staining and culture for acid fast bacilli should be performed. Biochemical analysis may help to differentiate a transudate from an exudate if the protein concentration is less than 30 g/l while a low concentration of glucose may be found in effusions associated with malignancy, infection or obstructed drainage.<sup>3</sup> Effusions may also be associated with decreased complement



Fig. 1 (top). Fig. 1. Absorption in suppurative and cystic changes in the left upper lobe.



Fig. 2 (bottom). Absorption in suppurative and cystic changes in the left upper lobe.

levels and a positive rheumatoid factor in the pleural fluid.

**Excluding.** Close liaison between the physician and the radiologist is essential in the investigation of abnormalities on the plain chest x-ray. The radiologist may judge the extent of technical factors on the x-ray apparatus, and may recommend additional projections such as oblique or lordotic views. Lateral decubitus films are valuable in differentiating pleural effusions from pleural thickening. Long-term and short-term follow-up films are essential in differentiating hilar structures, rounding away of the lung obscured by opacification

masking nodules because for the presence of systemic arteries or blood vessels and demonstrating the anatomy of the trachea and larger arteries.<sup>2</sup>

Bronchoscopy has usually only performed procedures and probes to surgery for bronchiectasis because they are poorly tolerated and of limited diagnostic value. The introduction of the flexible fiberoptic bronchoscope, however, has permitted extensive bronchoscopy to be performed with minimal discomfort to the patient.<sup>3</sup> The bronchoscope can be inserted in the segmental bronchi of the region of lung under scrutiny and contrast medium instilled through the suction/irrigator channel of the instrument. This technique may be used to assess the extent of bronchiectasis and may help in evaluating an opacity seen on chest x-ray.

**Case 1:** On routine chest x-ray, 28-year-old Robinson (Fig. 1) was found to have an abnormality and was referred for investigation of this. She was asymptomatic and there was no abnormal physical findings. The results of the study and an interview in the right paravertebral gutter suggested a pulmonary tumour and bronchogram examination was done relating to the finding of the study in right thoracic nodules.

Pleurogram bronchography was normal, and with the assistance of the right bronchogram the outline of the right breast was a normal bronchogram was performed. The dorsal component and lateral oblique of the subsequent branch of the right bronchogram were normal pulmonary artery. Due to no findings, this study was concluded by bronchography, such as bronchiectasis and pulmonary nodules. The patient was found to be asymptomatic and bronchogram examination of the left lung revealed a bronchogram. Right paravertebral gutter was normal and the right thoracic study was normal.

### Other imaging techniques

**Computed tomography (CT).** This technique has proved to be less of an advance in the diagnosis of chest disease than it has in the head or abdomen. Its limits of resolution for detecting parenchymal nodules are less compared with film diameter using conventional radiography but CT assesses differences between nodular deposits and benign



Fig. 1 Case 2 Right-sided pleural effusion diagnosed from chest x-ray.

nodules such as subpleural lymph nodes. However, CT is efficient in detecting pleural abnormalities, differentiating them from parenchymal disease, and determining their aetiology. It is this combined with the ability of CT to detect pulmonary metastatic lesions from conventional radiography, that renders the technique most useful in chest medicine.<sup>4</sup>

**Ultrasoundography.** A study performed has been found to be effective in differentiating pleural fluid from pleural thickening, and for determining the exact site of localized effusions for accurate thoracentesis.<sup>5</sup> It is simple, non-invasive and can be performed in the bedside.

### Fluoro techniques

**Fluoro scope.** This should be performed whenever the aetiology of a pleural effusion is in doubt, but there should be sufficient fluid present to allow adequate separation of the visceral and parietal layers thus confirming the nature of lung injury. The *Metcalf pleural layer method*<sup>6</sup> is simple to use and adequate specimens are obtained in 80% of patients. The correct diagnosis may be obtained by this technique in 60% of cases of tuberculous effusion and 57% of cases of pleural malignancy.<sup>11</sup> These figures









Fig. 1 Case 1. Bilateral hilar lymphadenopathy and hilar lymphadenopathy. Sarcoidosis (1982).



Fig. 2 Case 2. Diffuse bilateral interstitial thickening and bilateral hilar lymphadenopathy. Lymphangitis Carcinomatosa.

rapidly more diagnosed and dealt with (2 hours of the cell block) and the diagnosis and both right weeks after the onset of symptoms. At autopsy the lungs were heavy and a white opaque gelatinous mass present throughout the air spaces of both lungs. A primary carcinoma of the lower pharynx was macroscopically obvious.

**Preoperative lung biopsy.** Despite its high complication rate and failure rate, this remains a useful alternative to thoracotomy and open lung biopsy in patients with peripheral lesions beyond the range of transbronchial biopsy. Alfson and Hennigsen<sup>21</sup> have described a technique

for obtaining multiple biopsy specimens through a single lung puncture using a continuous split within the sheath of a needle. In their hands the technique has yielded clinically useful information in 85% of patients with no false positive diagnoses. Aspiration of collaterals material through a fine needle may also be useful for cytological or microbiological diagnosis.

#### Steps of Procedure

**Asbestos biopsy.** This procedure may be useful in the diagnosis of lung diseases which spread by the lymphatic route, eg bronchogenic carcinoma, sarcoidosis and metastatic lymphoma, and in less suspected entities such as fungi. A small incision at the base of the neck allows the passage of endoscopic instruments and lymph node biopsy.

**Mediastinoscopy.** An incision lateral to the sternum and insertion of a segment of metal cannula allows access to lesions in the anterior mediastinum beyond the range of mediastinoscopy.

**Thoracotomy.** This may be regarded if the procedure already outlined that is provides a more diagnosis. If solitary lesions are seen, it is often wise to proceed directly to thoracotomy without previous biopsy as this may demonstrate a tumour. The argument has probably been overstated, however, and an attempt should be made to obtain a diagnosis without resorting to thoracotomy.

**Comment.** Because these radiographs was requested for following an extensive but no difference in lung nodules, a 45 and 60-year-old male was admitted for symptoms of a "cough" since 1970. On 1971 the 50-year-old man was admitted to the Royal Naval Medical Service in 1970. Initially no treatment and asymptomatic remained that he lived in a rural area in Westmoreland. He usually previously had trouble a day from a deep cough, as it was usually the possibility of his (diagnosis was made) but in case of the diagnosis of biopsy of isolated node further investigations were advised using the completed 1970s but in this disease was found in the region. Thoracic bronchoscopy was



Fig. 14. Anteroposterior view of a lymphogram showing normal lymphatic distribution.

#### Superior lymphogram

normal and attempts to distinguish lymphatic from bronchovascular anatomy. Superficial lymphatics were successfully demonstrated in the axilla and found to be in positions corresponding to lymphatic drainage of lymphatic population. There was no other evidence of lymphatic disease, but it was concluded that the patient required the following therapy as per the United States guidelines.

**Case 5.** A 57-year-old female presented in October 1988 with symptoms of swelling and discomfort of the left axilla, arm, shoulder. Examination revealed signs of lymphatic disease in the axilla and chest. A large mediastinal mass with associated mediastinal lymphadenopathy (Fig. 15a) and a large axillary mass with associated axillary lymphadenopathy (Fig. 15b) were clearly visible on CT scan as well as a 1.0 × 1.0 × 1.0 cm ESR-47. There was a 1.0 × 1.0 × 1.0 cm axillary mass with associated axillary lymphadenopathy (Fig. 15c) and a 1.0 × 1.0 × 1.0 cm axillary mass with associated axillary lymphadenopathy (Fig. 15d).



Fig. 15. Lateral view of a lymphogram showing lymphatic distribution in the axilla and chest. (a) Axillary lymphatic distribution; (b) axillary lymphatic distribution; (c) axillary lymphatic distribution; (d) axillary lymphatic distribution.

examination showed large numbers of lymphatic nodes and significant lymphatic flow, suggesting a large lymphatic system. The lymphatic system was found to be in positions corresponding to lymphatic drainage of lymphatic population. There was no other evidence of lymphatic disease, but it was concluded that the patient required the following therapy as per the United States guidelines.

**Case 6.** A 27-year-old female developed a sudden onset of right axillary pain with swelling of the axilla and chest (Fig. 16). She was referred to a local hospital where a CT scan of the axilla and chest was performed. The CT scan showed a large axillary mass with associated axillary lymphadenopathy (Fig. 16a) and a large axillary mass with associated axillary lymphadenopathy (Fig. 16b) were clearly visible on CT scan as well as a 1.0 × 1.0 × 1.0 cm axillary mass with associated axillary lymphadenopathy (Fig. 16c) and a 1.0 × 1.0 × 1.0 cm axillary mass with associated axillary lymphadenopathy (Fig. 16d).



Fig. 17. Lateral view of a lymphogram showing lymphatic distribution in the axilla and chest. (a) Axillary lymphatic distribution; (b) axillary lymphatic distribution; (c) axillary lymphatic distribution; (d) axillary lymphatic distribution.

showed compression and displacement of the right main bronchus and a large tumour arising from the central airways. Endoscopy confirmed the left posterior and anterior oblique cuneiform lesions. The two anterior cuneiform and pleural nodules and biopsy located them. These findings showed that the tumour is in contact with the diaphragm. As regard to a second stage, it is hoped to be exploring the right lower lobe and clearing the diaphragmatic posterior cuneiform and nodules. If this was successful and the space was found to be a large & malignant tumour cell masses of the endobronchus. Following the course of extensive chemotherapy and occasional radiotherapy there is an evidence of marked tumour resorption on subsequent bronchoscopy.

### Conclusions

If the views presented here emphasize the importance of histological diagnosis in the investigation of the abnormal chest radiograph. For the sake of better case investigations such as the Mantoux and Kveim reaction have not been described with measurements of blood gases and pulmonary physiology do not contribute materially to the establishment of the diagnosis. It is stressed that close co-operation is necessary between the physician, the radiologist and the histopathologist.

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### Military Image of the Navy

The Military Image of the Navy has recently been put under pressure. Discussion on the principles, practice and representation of military surgery and its associated sciences. The late President of the Society, Sir Guy D'Oyly-Jones, 1959-60, Sir M. Lloyd Garrison, 1960-61, in the Society's literature, and the numerous papers they have held at their annual Congresses of the Royal College of Surgeons, have been of great help.

Editorial collaboration of the Society is again an old idea, perhaps, as the late President, Sir Guy D'Oyly-Jones, 1959-60, Sir M. Lloyd Garrison, 1960-61, in the Society's literature, and the numerous papers they have held at their annual Congresses of the Royal College of Surgeons, have been of great help.

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# Adult Celiac Disease — A Treatable Cause of Chronic Ill Health

L. J. Berk and L. G. Williams

## Abstract

*Adult celiac disease is a cause of chronic ill health due to protein/malabsorption. The symptoms, however, may be vague and variable, and as distinct as in other chronic diseases. The diagnosis is by biopsy of the small intestine showing characteristic changes and treated by gluten withdrawal.*

## Introduction

Adult celiac disease (gluten sensitive enteropathy) can present quite varied but characteristic celiac sprue primary malabsorption syndromes in a condition of intestinal atrophy with a distinct familial susceptibility which may persist to age 80 from adolescence to old age. Classical features are those of malabsorption with wasting, weight loss and diarrhea<sup>1</sup> though more recently it has become recognized that the presenting features may be subtle and variable.<sup>2</sup>

The overall prevalence of the disease is said to be of the order of one in 1,050 of the population,<sup>3</sup> though it has been suggested that the condition is much under diagnosed, largely due to the trivial nature of its obvious presenting symptoms.<sup>4</sup> Nine cases of adult celiac disease were diagnosed at the Royal Naval Hospital, Plymouth, in the period 1960-62 and a review of these cases between themselves very well the broad spectrum of clinical presentation of the condition.

## Cases Reports

**Case 1.** This 41 year old housewife gave a six year history of progressive digestive discomfort with radiation to the back. In

the three months before referral she had noticed 10% weight loss, though denied any intestinal malabsorption or change in bowel habit. The initial diagnosis was gastric ulcer but upper gastrointestinal endoscopy showed macroscopic and microscopic disorders only. A mild iron deficiency anemia was present. X-ray of biopsy showed total villous atrophy.

**Case 2.** This 34 year old man gave a three month history of bone pain, and half a stone weight loss. Such these symptoms had existed by the time he was sent to our practice for a hemoglobin of 12.5 g % with low serum iron and failed prompted a proximal biopsy which showed total villous atrophy.

**Case 3.** This 47 year old housewife gave a six year history of bone and joint pains which had initially been diagnosed as osteoporosis, rheumatoid arthritis and for which she had received gold sodium and penicillamine treatment. At the time of diagnosis she had a classical wedding girdle of osteoporosis. She admitted no diarrhoea or loss weight but not to increased weight loss, and denied any change in bowel habit. Investigation revealed normal serum calcium, low low serum phosphate and an elevated alkaline phosphatase. X-ray confirmed osteoporosis and proximal biopsy showed total villous atrophy.

**Case 4.** This 35 year old housewife gave a one year history of weight loss, weakness,

epigastric pain and lossness of her stools. Full blood picture showed a mild iron deficiency anaemia. jejunal biopsy showed patchy villous atrophy.

**Case 3.** This 22 year old woman presented severely with itchy and was found to be hypochromic. She had been under investigation for a year for vague symptoms of weakness, weight loss and mild lossness of her stools. jejunal biopsy showed total villous atrophy.

**Case 4.** This 36 year old housewife presented with weight loss and diarrhoea but had been investigated five years previously for a severe iron deficiency anaemia. This was attributed to her periods at that time but she denied that she had suffered significant menorrhagia. jejunal biopsy showed subtotal villous atrophy.

**Case 5.** This 51 year old retired engineer presented with fluctuating weight loss and dyspepsia. He denied any change in bowel habit. These symptoms had been present for at least four years and it was noted that six years previously he had been investigated for an iron and folate deficiency anaemia. jejunal biopsy showed subtotal villous atrophy.

**Case 6.** This 17 year old sailor had suffered from disabling diarrhoeal stools, pain for six years and was about to be discharged from the Royal Navy. Three years prior to diagnosis he had been investigated for a new onset weight loss which had resolved spontaneously. jejunal biopsy was not performed at that time and his weight loss was attributed to emotional factors. A mild iron and lossness of his stools was noted in the Haematology Clinic. jejunal biopsy showed total villous atrophy.

**Case 7.** This 34 year old housewife gave an eight year history of intermittent diarrhoea and anorexia with a polyarthropathy

affecting knees and metacarpophalangeal joints. She later commented on a large range of non-inflammatory aches. She was also described as being prone to recurrent apnoea and had previously been investigated for iron deficiency anaemia. Investigation revealed a macrocytic anaemia with low serum iron. jejunal biopsy showed patchy villous atrophy.

All these nine cases made symptomatic and haematological or biochemical responses on treatment with a gluten free diet. All except Case 9 have had repeat jejunal biopsies which have shown improvement.

### Discussion

It is striking that in only three of these cases (2, 4 and 6) did the presenting symptoms include a classical combination of weight loss and diarrhoea, and even in one of these a lapse of one year occurred before referral and diagnosis. In the remaining six cases the presenting symptoms were diverse and of varying severity. They included dyspeptic abdominal pain, varicose or bowel habit (including constipation), restless legs/arms and joint pain. In all the severity of subjective premonitory ill health only became apparent after treatment with gluten free diet had commenced and produced a substantial improvement in wellbeing.

It has recently been noted that psychiatric illness is common in coeliac disease.<sup>1</sup> Four of our patients (Cases 1, 3, 6 and 9) had been under treatment for depression or some form in the few months or years before diagnosis. This is probably related to the subjective malaise that is associated with adult coeliac disease and certainly all of them found a marked decrease in mood with gluten withdrawal.

Chemical and biochemical evidence for chronic malabsorption was present in two cases: one with osteomalacia and one with urinary lithiasis improved on withdrawal of

gluten. Two other cases complained of significant skeletal pain without evidence for vitamin malabsorption and these also improved on treatment. In one patient whose chondrocalcinosis positive had been ascribed to osteoarthritis but failure at the Service for improvement was great enough for him to be referred to Medical Category F1. His direct link between coeliac disease and polyarthralgia has yet been established though a relationship was noted by Cooke and colleagues in 1951.<sup>1</sup> Subjective improvement in skeletal pain on treatment with a gluten free diet could be secondary to an improvement in nutrition, as well as to a possible increase in absorption of anti-inflammatory drugs.

*Antisera which pain is present* was a feature in two cases. This was usually mild though in two cases had been severe. Iron deficiency was emphasized in all cases though in two there was also evidence for folate malabsorption. It is well known that 81% deficiency also also points to coeliac disease<sup>2</sup> though this was not found in any of our cases. It is noteworthy that three of the patients had been investigated for systemic coeliac disease within 10 years, and one patient had been investigated for weight loss without a special biopsy being performed three years before the diagnosis was finally made.

In none of these nine cases was the initial presentation so novel that it had not been previously described in the literature.<sup>3-5</sup> Yet the delay in diagnosis in writing and similar to the delay encountered by Bhatia and Gorman and reported in 1961.<sup>5</sup> All except one (Case 2) had experienced their symptoms for at least a year, and most for four years or more before the diagnosis was finally made. The vague and local occurrence of symptoms may account for a delay in the patient first seeking medical advice from further prolonged nervous concern both at primary and level and in hospital. It is clear that a chronic awareness and a high index of

suspicion for the disease is essential if such delays are to be avoided.

Management of coeliac disease relies on the correct choice of a gluten free diet. This requires close supervision and the co-operation of an enthusiastic Coeliac Membership of the Coeliac Society by the patient is also very helpful. Symptomatic improvement is rapid but histological resolution may take many months. Close and continuing follow up of these patients with repeat special biopsies is essential. All our patients improved symptomatically on a gluten free diet and the eight who have undergone biopsies to date have also shown histological improvement. If not resolution

### Conclusion

Adult coeliac disease is a relatively common but under diagnosed disorder. A high index of clinical suspicion is required to make the diagnosis, which should be considered in all patients presenting with vague symptoms of ill health, particularly if this is associated with weight loss, change in bowel habit, abnormal or skeletal pain. Evidence of iron or folate deficiency anaemia, or vitamin malabsorption are strong pointers to the diagnosis in such situations.

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## A Study of the Immediate Effects of Welding Fumes on Pulmonary Function\*

T. J. E. Francis

### Abstract

A laboratory experiment was conducted to determine the acute effects of welding fumes on the pulmonary function of welders. At a rate of 1 liter per minute, fumes of welds of a type (see Fig. 1) that is a low grade steel were collected in a small bag. These fumes were inhaled by subjects in small trials of 1 hour. At the end of the trial, the subjects were given a pulmonary function test. The results of pulmonary function tests performed before and after exposure demonstrate that the fumes produced by manual metal arc welding at a rate of 1 liter per minute did not cause any adverse effects on pulmonary function. This is all in contrast to the fact that there is a considerable delay in the time required for the fumes to be removed from the lungs. The results of this study are compared to the data generated by other tests and welding techniques with fumes.

### Introduction

In the course of welding operations, there is a requirement to weld together sections of pressure hull. This involves the manual metal arc (MMA) welding of sections of high grade steel subjected to about 60°C. This frequently takes place in poorly ventilated confined spaces or in restricted areas of large compartments. The practical difficulties in adequately ventilating some of these spaces are such that welders may be exposed to a considerable accumulation of fume. It was decided that the effect of any of relatively short exposure to this high level of fume should be investigated.

The effects of fume of welding fume have been extensively investigated and are well covered by McMillan<sup>1</sup> who shows that many findings, particularly those relating to pulmonary disease remain controversial.

Delayed effects of any acute ex-

posure to a number of hours after welding and may take a number of days. The most common of these is metal fume fever, which consists of a self-limiting febrile illness commencing sometime 10-24 hours after welding and it may last for up to 14 hours. A number of metal fumes have been implicated, particularly zinc and copper, but the exact mechanism remains unclear.<sup>2</sup>

The specific toxic effects of some metals are well known. Exposure to these with an intention may also a delay of time to severe fume, such as a chemical pneumonitis that is occasionally fatal.<sup>3</sup> The gases produced by the welding process may also cause delayed effects. Korte<sup>4</sup> describes a case of pulmonary edema with an onset of 4-5 hours after exposure to welding fume in a confined space which was attributed to an accumulation of oxides of nitrogen. Nitrogen dioxide in a concentration of only 4.5 parts per million has been found to cause a mild inflammatory mucosal response that results in increased airway resistance.<sup>5</sup>

The immediate effects of welding fume have been scarcely investigated. The respiratory tract would be expected to be the site of any reaction to inhaled gases or fine particulate matter. Indeed, a number of the components of welding fume are known to be acute pulmonary irritants. Nitrogen dioxide for example has been shown to irritate almost immediately at normal rates up to 10-25 after brief exposure to concentrations as low as 1.5

\*Based on a dissertation presented to the University of London (Department of Health and Safety) in January 1981.



parts per million.<sup>4</sup> Given at concentrations of 50–100 parts per million have been reported as having increased average mortality.<sup>5</sup>

Of the particulate components, fluorides are thought to be pulmonary irritants,<sup>6</sup> but their relatively small effect on adding to the effect is suggested to be due to complex formation with iron.<sup>7</sup> Nickel has been shown to cause occupational asthma<sup>8</sup> and other metal or chemicals are thought to be responsible for occupational asthma in stainless steel welders.<sup>9</sup>

Welding fumes therefore must contain a number of components, each of which at sufficient concentration can cause an immediate increase in bronchial irritability, as occurred in previously exposed individuals. Individual components of fume rarely reach sufficient concentrations to cause an increase in bronchial irritability. However, the possibility of a combined effect of sub-threshold doses of the potentially cytotoxic pulmonary irritants that exist in welding fume has not been thoroughly investigated. In the only previous study known to the author, no significant change in pulmonary function occurred in 25 welders using a general purpose metal electrode during an eight hour shift.<sup>10,11</sup> There appeared, however, to be a positive correlation between increased residual volume and exposure to fume.

This study is an attempt to investigate the combined effects on pulmonary function of exposure to welding fume similar to that encountered in industry.

#### Methods and Materials

Due to lack of space it is not possible to perform elaborate pulmonary function testing in a submarine. Consequently a brief series of eight tests, welding in two small compartments in a submarine was undertaken in order to get some idea of the fume load to which they were exposed. A sample of 25 welders, who worked in

submarines were then exposed to similar levels in the controlled environment of the exposure chamber at the Medical Research Council Toxicology Unit (Clinical Section) at St Bartholomew's Hospital, London. The effect on pulmonary function was measured.

#### Selection of Study Sample

All 25 welders, working in welding in submarines in HM Dockyard Chatham, were approached with details of the experiment and asked to volunteer. Those who did not volunteer were requested to provide a reason. Management were asked to select and replace for us, day two men per week for 13 weeks. Selection was on the basis of availability (on the day shift, on the holiday or off work etc). Each subject completed at interview the MRC Respiratory Symptom Questionnaire (RSQ) and additional questions concerning exposure to asbestos. They also completed a full occupational history and welding experience questionnaire. Each subject then had a medical examination and full plain chest X-ray. Of the 25 subjects selected one was rejected because of cardiac failure.

#### Pulmonary Function Testing

Each subject completed four batches of pulmonary function tests.

1. Initial test consisting of: Lung volume by helium dilution in a closed system spirometer; carbon monoxide transfer factor by the single breath technique; the result being taken as the mean of two tests, then the result a residual volume was derived. FEV<sub>1</sub>, FVC & FEV<sub>1</sub>/FVC ratio were measured on a Berman and Mandel type spirometer; the result being taken as the mean of 3 flows; peak flow was measured by a Wright's peak flow meter; the result being taken as the mean of the three best values out of five.

2. Following the initial batch of tests each subject was rested for 100 minutes in the laboratory or a welding fume free

environment. The monitor for oxygen and peak flow measurements were also required.

3. Each subject was then asked to rest in the exposure chamber for 90 minutes and on completion the second batch of tests was repeated.

4. On completing batch 3, the subject was given two puffs of 100 µg Salbutamol from a metered inhaler and after about five minutes the oxygen and peak flow were repeated.

The experiments were staggered so that only one man was in the chamber at any one time, each subject being offered serial A or B by the use of a coin.

Serial A	09.00-10.00
Serial B	10.00-10.50

With such a large overlap it was considered that the effect of any diurnal changes between the shifts would be negligible. During the experimental working was discouraged and only a light packed lunch was eaten between trials 1 and 2.

#### The Exposure Chamber

This was a 20 m<sup>3</sup> sealed chamber with controllable rates of fresh air input and recirculation. The chamber contained a bench on which there was a clean pan of H<sub>2</sub> 60 steel. Each welder was asked to use 25-18 gauge Fortres E 1048 rods over a 90 minute period, a standard 120-amps current was used and the welder simply reinforced the pan of steel. As no instant check on heat generated, breathing zone gas levels were constantly monitored using by Beckman chemoluminescent ozone monitor carbon monoxide by analyzer electrochemical monitor, nitric oxide and other modes of nitrogen by TeCo 148 chemoluminescent monitor.

The outputs were displayed on a Lintec 6 channel recorder. By altering the ventilation to the chamber and, if necessary, the rate of working, reasonably constant pollution levels could be maintained.

#### Fume Exposure

Breathing zone fume levels in the work place and in the exposure chamber was sampled on a 8 µm PVE 33 mm filter in a sampling head to standards BS (DD 54) (1977) connected by PTFE (polytetrafluoroethylene) tubing to a Barlow and Sheldahl L2 SF pump sampling at 2 litres per minute. The sampling head was attached by an arm to a head band such that the filter was positioned in the side of the face between nose and mouth. During working this was behind the face which was usually head held, then sampling was breathing zone fume. Background fume levels were measured by a diluter pump head and filter positioned behind and below the welder and a high volume (Napco sampler using a glass filter filter) sampling at about 20 litres per minute positioned above the welder.

#### Analysis of Fumes

Background and breathing zone fume levels were measured gravimetrically. Data provided by the British Oxygen Company estimated the fume of the Fortres E 1048 rod to contain equivalent amounts of iron, manganese and fluorine (Table 1). Breathing zone filters were analysed at the Admiralty Marine Technology Laboratory Portsmouth for these elements. A number of fume samples were taken by a Gaele thermal precipitator and examined by electron microscopy.

#### Results

The brief field study of eight men working in two compartments of a submarine had demonstrated that both fume exposure and working time vary greatly from one welder to another.

Mean fume during zone fume exposure

0.45 mg m<sup>-3</sup> ± S.D. 0.27

Mean working time

78.12 minutes ± S.D. 21.2

It was decided to use for a chamber exposure of 20 mg m<sup>-3</sup> for 90 minutes as being



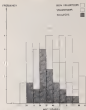


Fig 1 Right posterior (right) lobes



Fig 2 Right anterior (right) lobes

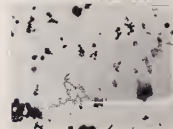


Fig 3 Aerial photograph of the coast of Devon, UK. Fig 4 is a right oblique photograph of 1992

larger and wider particles and the more aggregated particles can reach the center of the figure. Without knowledge of the dimensions of such particle, no aerodynamic diameter can be calculated; however, one would expect about 10% of the larger and wider more of the smaller particles to be deposited in the trachea bronchial tree.<sup>11</sup>

### The Sample

As can be seen from Figures 1 and 2, the study population is similar to the age and experience distribution of the volunteers. The non volunteers tended to be the older, more experienced welders. The reasons given by non volunteers for not participating were:

- None/parents 17
- Too old/lost a leg 4
- Chronic bronchitis or tuberculosis 5
- Involved in previous studies 2

Thus the sample is biased in favour of younger, less experienced fit welders.

### Pulmonary Function Testing

The values of the initial tests of pulmonary function tests are shown in Table 5 and the changes that took place during the control period using in the laboratory during welding and after follow-up are shown in Tables 6, 7 and 8. Testing of significance was by paired  $t$  test. 2 tailed with 34 degrees of freedom. Attempts to correlate the observed changes with likely influencing factors showed no apparent correlation with breathing some loose level smoking habit age or welding experience.

### Discussion

There are a number of uncertainties remaining which influence a weighty breathing some loose level, including

Table 5  
Initial values of pulmonary function tests (1979)

	FEV <sub>1</sub>	FVC	FVC/FEV <sub>1</sub>	RV	T <sub>l</sub>	DL <sub>CO</sub>	DL <sub>CO</sub>
	lit	lit	lit	lit	lit	lit	lit
Vol (vol)	lit	lit	lit	lit	lit	lit	lit
Vol 1	5.1	1.004	0.19	0.004	4.1	0.005	0.1
Vol 2	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 3	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 4	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 5	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 6	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 7	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 8	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 9	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 10	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 11	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 12	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 13	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 14	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 15	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 16	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 17	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 18	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 19	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 20	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 21	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 22	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 23	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 24	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 25	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 26	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 27	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 28	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 29	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 30	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 31	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 32	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 33	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 34	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 35	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 36	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 37	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 38	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 39	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 40	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 41	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 42	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 43	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 44	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 45	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 46	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 47	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 48	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 49	5.1	0.975	0.19	0.004	4.1	0.005	0.1
Vol 50	5.1	0.975	0.19	0.004	4.1	0.005	0.1

lit = litres/min

lit = litres

Physiology for non volunteers: September 22 1979 1979 1979 1979 1979 1979 1979 1979

TABLE 1  
Changes seen in each subject between July 1 and 2  
(95% probability intervals for each value)

Subject	Age	Sex	FEV <sub>1</sub> /FVC	FE	PE	AB
			(%)	(l/min)	(l/min)	(mm)
1	34	M	-0.08	0	0	-0.06
2	34	M	-0.02	1	15	-0.03
3	34	M	-0.02	1	25	-0.01
4	34	M	-0.02	0	20	-0.02
5	34	M	-0.06	1	19	-0.02
6	34	M	-0.00	4	26	-0.04
7	34	M	-0.08	1	17	-0.03
8	34	M	-0.05	2	4	-0.02
9	34	M	-0.01	0	22	-0.05
10	34	M	-0.01	1	7	-0.05
11	34	M	-0.01	1	47	-0.05
12	34	M	-0.06	0	19	-0.05
13	34	M	-0.02	1	19	-0.01
14	34	M	-0.04	0	4	-0.01
15	34	M	-0.06	0	1	-0.05
16	34	M	-0.08	0	2	-0.04
17	34	M	-0.01	1	15	-0.04
18	34	M	-0.03	0	7	-0.04
19	34	M	-0.01	0	27	-0.02
20	34	M	-0.01	0	2	-0.04
21	34	M	-0.01	0	2	-0.04
22	34	M	-0.01	0	15	-0.01
23	34	M	-0.01	0	0	-0.05
24	34	M	-0.01	0	0	-0.05
25	34	M	-0.01	0	0	-0.05
26	34	M	-0.01	0	0	-0.05
27	34	M	-0.01	0	0	-0.05
28	34	M	-0.01	0	0	-0.05
29	34	M	-0.01	0	0	-0.05
30	34	M	-0.01	0	0	-0.05
31	34	M	-0.01	0	0	-0.05
32	34	M	-0.01	0	0	-0.05
33	34	M	-0.01	0	0	-0.05
34	34	M	-0.01	0	0	-0.05
35	34	M	-0.01	0	0	-0.05
36	34	M	-0.01	0	0	-0.05
37	34	M	-0.01	0	0	-0.05
38	34	M	-0.01	0	0	-0.05
39	34	M	-0.01	0	0	-0.05
40	34	M	-0.01	0	0	-0.05
41	34	M	-0.01	0	0	-0.05
42	34	M	-0.01	0	0	-0.05
43	34	M	-0.01	0	0	-0.05
44	34	M	-0.01	0	0	-0.05
45	34	M	-0.01	0	0	-0.05
46	34	M	-0.01	0	0	-0.05
47	34	M	-0.01	0	0	-0.05
48	34	M	-0.01	0	0	-0.05
49	34	M	-0.01	0	0	-0.05
50	34	M	-0.01	0	0	-0.05
51	34	M	-0.01	0	0	-0.05
52	34	M	-0.01	0	0	-0.05
53	34	M	-0.01	0	0	-0.05
54	34	M	-0.01	0	0	-0.05
55	34	M	-0.01	0	0	-0.05
56	34	M	-0.01	0	0	-0.05
57	34	M	-0.01	0	0	-0.05
58	34	M	-0.01	0	0	-0.05
59	34	M	-0.01	0	0	-0.05
60	34	M	-0.01	0	0	-0.05
61	34	M	-0.01	0	0	-0.05
62	34	M	-0.01	0	0	-0.05
63	34	M	-0.01	0	0	-0.05
64	34	M	-0.01	0	0	-0.05
65	34	M	-0.01	0	0	-0.05
66	34	M	-0.01	0	0	-0.05
67	34	M	-0.01	0	0	-0.05
68	34	M	-0.01	0	0	-0.05
69	34	M	-0.01	0	0	-0.05
70	34	M	-0.01	0	0	-0.05
71	34	M	-0.01	0	0	-0.05
72	34	M	-0.01	0	0	-0.05
73	34	M	-0.01	0	0	-0.05
74	34	M	-0.01	0	0	-0.05
75	34	M	-0.01	0	0	-0.05
76	34	M	-0.01	0	0	-0.05
77	34	M	-0.01	0	0	-0.05
78	34	M	-0.01	0	0	-0.05
79	34	M	-0.01	0	0	-0.05
80	34	M	-0.01	0	0	-0.05
81	34	M	-0.01	0	0	-0.05
82	34	M	-0.01	0	0	-0.05
83	34	M	-0.01	0	0	-0.05
84	34	M	-0.01	0	0	-0.05
85	34	M	-0.01	0	0	-0.05
86	34	M	-0.01	0	0	-0.05
87	34	M	-0.01	0	0	-0.05
88	34	M	-0.01	0	0	-0.05
89	34	M	-0.01	0	0	-0.05
90	34	M	-0.01	0	0	-0.05
91	34	M	-0.01	0	0	-0.05
92	34	M	-0.01	0	0	-0.05
93	34	M	-0.01	0	0	-0.05
94	34	M	-0.01	0	0	-0.05
95	34	M	-0.01	0	0	-0.05
96	34	M	-0.01	0	0	-0.05
97	34	M	-0.01	0	0	-0.05
98	34	M	-0.01	0	0	-0.05
99	34	M	-0.01	0	0	-0.05
100	34	M	-0.01	0	0	-0.05

posture, pattern of working and air height. It is not surprising therefore that levels recorded both at the work place and in the exposure chamber show a considerable scatter. Despite this variation it can be seen that the levels achieved in the chamber are very similar to those observed at work.

The tests of ventilatory function used reflect mainly the state of the lungs at rest. As these contribute greatly to total airways resistance,<sup>11</sup> small changes in airways resistance should be demonstrated. As at date there is so widely accepted test of small airways function, an attempt was made to detect rate changes in this part of the lung. Any changes in the tests performed were assessed by comparing our baseline results with the preceding set. With

the longest interval between test being 100 minutes of the control period, the effects of any diurnal variation can be gauged more changes over such short periods are regarded as negligible.<sup>12, 13</sup>

The results of the pulmonary function testing are presented with the exception of residual volume and transfer factor. There are no significant changes in pulmonary function over the control period. The results of residual volume and transfer factor measurements changed considerably within subject variability and the small changes observed are not considered to be of importance despite the apparent statistical significance. Table 7 demonstrates the changes that occurred over the 90 minutes in the working chamber. These are small

Table 1  
Changes seen in each subject between tests 1 and 3  
(FEN, FEN<sub>1</sub> and other values)

Subject	FEN	FEN <sub>1</sub> (FEN)	FEV <sub>1</sub>	FEV <sub>1</sub> (FEV <sub>1</sub> )	FEV <sub>1</sub> (FEV <sub>1</sub> )	FEV <sub>1</sub> (FEV <sub>1</sub> )
1	0.05	1	0.05	0.05	0.05	0.05
2	0.05	0	0.05	0.05	0.05	0.05
3	0.05	0	0.05	0.05	0.05	0.05
4	0.05	0	0.05	0.05	0.05	0.05
5	0.05	0	0.05	0.05	0.05	0.05
6	0.05	0	0.05	0.05	0.05	0.05
7	0.05	0	0.05	0.05	0.05	0.05
8	0.05	0	0.05	0.05	0.05	0.05
9	0.05	0	0.05	0.05	0.05	0.05
10	0.05	0	0.05	0.05	0.05	0.05
11	0.05	0	0.05	0.05	0.05	0.05
12	0.05	0	0.05	0.05	0.05	0.05
13	0.05	0	0.05	0.05	0.05	0.05
14	0.05	0	0.05	0.05	0.05	0.05
15	0.05	0	0.05	0.05	0.05	0.05
16	0.05	0	0.05	0.05	0.05	0.05
17	0.05	0	0.05	0.05	0.05	0.05
18	0.05	0	0.05	0.05	0.05	0.05
19	0.05	0	0.05	0.05	0.05	0.05
20	0.05	0	0.05	0.05	0.05	0.05
21	0.05	0	0.05	0.05	0.05	0.05
22	0.05	0	0.05	0.05	0.05	0.05
23	0.05	0	0.05	0.05	0.05	0.05
24	0.05	0	0.05	0.05	0.05	0.05
25	0.05	0	0.05	0.05	0.05	0.05
26	0.05	0	0.05	0.05	0.05	0.05
27	0.05	0	0.05	0.05	0.05	0.05
28	0.05	0	0.05	0.05	0.05	0.05
29	0.05	0	0.05	0.05	0.05	0.05
30	0.05	0	0.05	0.05	0.05	0.05
31	0.05	0	0.05	0.05	0.05	0.05
32	0.05	0	0.05	0.05	0.05	0.05
33	0.05	0	0.05	0.05	0.05	0.05
34	0.05	0	0.05	0.05	0.05	0.05
35	0.05	0	0.05	0.05	0.05	0.05
36	0.05	0	0.05	0.05	0.05	0.05
37	0.05	0	0.05	0.05	0.05	0.05
38	0.05	0	0.05	0.05	0.05	0.05
39	0.05	0	0.05	0.05	0.05	0.05
40	0.05	0	0.05	0.05	0.05	0.05
41	0.05	0	0.05	0.05	0.05	0.05
42	0.05	0	0.05	0.05	0.05	0.05
43	0.05	0	0.05	0.05	0.05	0.05
44	0.05	0	0.05	0.05	0.05	0.05
45	0.05	0	0.05	0.05	0.05	0.05
46	0.05	0	0.05	0.05	0.05	0.05
47	0.05	0	0.05	0.05	0.05	0.05
48	0.05	0	0.05	0.05	0.05	0.05
49	0.05	0	0.05	0.05	0.05	0.05
50	0.05	0	0.05	0.05	0.05	0.05

Table 2  
Changes seen in each subject between tests 1 and 4  
(FEN, FEN<sub>1</sub> and other values)

Subject	FEN	FEN <sub>1</sub> (FEN)	FEV <sub>1</sub>	FEV <sub>1</sub> (FEV <sub>1</sub> )	FEV <sub>1</sub> (FEV <sub>1</sub> )	FEV <sub>1</sub> (FEV <sub>1</sub> )
1	0.05	1	0.05	0.05	0.05	0.05
2	0.05	0	0.05	0.05	0.05	0.05
3	0.05	0	0.05	0.05	0.05	0.05
4	0.05	0	0.05	0.05	0.05	0.05
5	0.05	0	0.05	0.05	0.05	0.05
6	0.05	0	0.05	0.05	0.05	0.05
7	0.05	0	0.05	0.05	0.05	0.05
8	0.05	0	0.05	0.05	0.05	0.05
9	0.05	0	0.05	0.05	0.05	0.05
10	0.05	0	0.05	0.05	0.05	0.05
11	0.05	0	0.05	0.05	0.05	0.05
12	0.05	0	0.05	0.05	0.05	0.05
13	0.05	0	0.05	0.05	0.05	0.05
14	0.05	0	0.05	0.05	0.05	0.05
15	0.05	0	0.05	0.05	0.05	0.05
16	0.05	0	0.05	0.05	0.05	0.05
17	0.05	0	0.05	0.05	0.05	0.05
18	0.05	0	0.05	0.05	0.05	0.05
19	0.05	0	0.05	0.05	0.05	0.05
20	0.05	0	0.05	0.05	0.05	0.05
21	0.05	0	0.05	0.05	0.05	0.05
22	0.05	0	0.05	0.05	0.05	0.05
23	0.05	0	0.05	0.05	0.05	0.05
24	0.05	0	0.05	0.05	0.05	0.05
25	0.05	0	0.05	0.05	0.05	0.05
26	0.05	0	0.05	0.05	0.05	0.05
27	0.05	0	0.05	0.05	0.05	0.05
28	0.05	0	0.05	0.05	0.05	0.05
29	0.05	0	0.05	0.05	0.05	0.05
30	0.05	0	0.05	0.05	0.05	0.05
31	0.05	0	0.05	0.05	0.05	0.05
32	0.05	0	0.05	0.05	0.05	0.05
33	0.05	0	0.05	0.05	0.05	0.05
34	0.05	0	0.05	0.05	0.05	0.05
35	0.05	0	0.05	0.05	0.05	0.05
36	0.05	0	0.05	0.05	0.05	0.05
37	0.05	0	0.05	0.05	0.05	0.05
38	0.05	0	0.05	0.05	0.05	0.05
39	0.05	0	0.05	0.05	0.05	0.05
40	0.05	0	0.05	0.05	0.05	0.05
41	0.05	0	0.05	0.05	0.05	0.05
42	0.05	0	0.05	0.05	0.05	0.05
43	0.05	0	0.05	0.05	0.05	0.05
44	0.05	0	0.05	0.05	0.05	0.05
45	0.05	0	0.05	0.05	0.05	0.05
46	0.05	0	0.05	0.05	0.05	0.05
47	0.05	0	0.05	0.05	0.05	0.05
48	0.05	0	0.05	0.05	0.05	0.05
49	0.05	0	0.05	0.05	0.05	0.05
50	0.05	0	0.05	0.05	0.05	0.05

but statistically significant changes in FEN, FEN<sub>1</sub>, FEV<sub>1</sub> rates and peak flow. In the direction of the changes, subjects reduced rather than increased airway resistance. It is possible that the exposure is a small learning effect, but the trend was not continued into Table 3. That there was no apparent improvement in ventilation, despite a trend of rising tidal volume suggests that the subjects were fully bronchodilated on leaving the exposure chamber. It is possible that the measurable increase in temperature within the chamber contributed towards this, but these findings provide no evidence for an immediate decrease in pulmonary function as a result of exposure to welding fumes at high concentration.

During the 90 minutes exposure to

exposures of welding have exceeded the TLV when time weighted over eight hours. A man at most, however, may be expected to have two or three such exposures per day. Consequently the TLV/TWA for manganese and fluoride may be approached or even exceeded. Although no clinical examination was made of the subjects demonstrated acute features of chronic toxicity to other elements. Biological monitoring in the workplace (perhaps by measuring urinary fluoride levels) would be worth undertaking to assess exposure in situ.

Finally it must be stressed that the term welding fume is a loose one and covers a large variety of particulate and gaseous combinations. The results of this experiment are only valid for MnBa welding with a Fluxcore E 11818 rod on a clean steel surface. The fumes generated using different rods and techniques on possibly contaminated surfaces may have different effects.

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ford) where sufficient staff worked in parallel with the practical work.

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## Drug Treatment of Motion Sickness\*

C. A. Sklar

### Introduction

Motion sickness is a clinical term used to designate one category of vestibular side effects resulting from a too rapid transition into certain external motion environments. It had been assumed that the primary sensation of motion sickness was vomiting but it is now recognized that motion sickness is a symptom complex characterized by pallor, cold sweating, salivation, stomach distress and vomiting. Other symptoms are frequently present and vary considerably between individuals and existing circumstances. They include ringing, roaring, hyperaesthesia, dizziness, headache and malaise/llethargy.

Many different situations provide the symptoms of motion sickness and they can be characterized by a continuum of sensory management in which the sensory signals transmitted by the eye, the vestibular system and the non-vestibular proprioceptors are at variance with each other and with what is expected on the basis of past experience. The vestibular system is always implicated in the development of motion sickness. Some examples of the wide variety of situations in which motion sickness develops are given in Table 1.<sup>1</sup>

Motion sickness could be described as a self-inflicted condition caused by the present day necessity for man to passively propel himself rather for duty or for leisure. There is a requirement for the individual to

be a controllable, or passive and drug dependent although not ideal is often the only solution to the problem. Most substances with a known pharmacological action have been tried in the prevention and treatment of motion sickness, together with almost everything that can be swallowed and a few substances which possibly might not in fact have been considered. One of the most obvious remedies dates from 1862 and consists of arsenicals flavoured with red herring.<sup>2</sup> Treatment has recently been rationalized to a few drugs but no agreement has been reached as to which drug is most effective. The difficulty in recommending a particular drug for the treatment of motion sickness lies in the abundance of poorly designed drug trials in which a wide variety of motion stimuli have been used, thus making comparison of results virtually impossible. This paper describes the reasons why many of these

Table 1  
Situations<sup>1</sup>

	motion
1 and 2	1. Motion from the vertical to the horizontal or vice versa
3	2. Motion in a circle
4	3. Motion in a straight line
5	4. Motion in a circle
6	5. Motion in a straight line
7	6. Motion in a circle
8	7. Motion in a straight line
9	8. Motion in a circle
10	9. Motion in a straight line
11	10. Motion in a circle
12	11. Motion in a straight line
13	12. Motion in a circle
14	13. Motion in a straight line
15	14. Motion in a circle
16	15. Motion in a straight line
17	16. Motion in a circle
18	17. Motion in a straight line
19	18. Motion in a circle
20	19. Motion in a straight line
21	20. Motion in a circle
22	21. Motion in a straight line
23	22. Motion in a circle
24	23. Motion in a straight line
25	24. Motion in a circle
26	25. Motion in a straight line
27	26. Motion in a circle
28	27. Motion in a straight line
29	28. Motion in a circle
30	29. Motion in a straight line
31	30. Motion in a circle
32	31. Motion in a straight line
33	32. Motion in a circle
34	33. Motion in a straight line
35	34. Motion in a circle
36	35. Motion in a straight line
37	36. Motion in a circle
38	37. Motion in a straight line
39	38. Motion in a circle
40	39. Motion in a straight line
41	40. Motion in a circle
42	41. Motion in a straight line
43	42. Motion in a circle
44	43. Motion in a straight line
45	44. Motion in a circle
46	45. Motion in a straight line
47	46. Motion in a circle
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50	49. Motion in a straight line
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56	55. Motion in a straight line
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62	61. Motion in a straight line
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77	76. Motion in a circle
78	77. Motion in a straight line
79	78. Motion in a circle
80	79. Motion in a straight line
81	80. Motion in a circle
82	81. Motion in a straight line
83	82. Motion in a circle
84	83. Motion in a straight line
85	84. Motion in a circle
86	85. Motion in a straight line
87	86. Motion in a circle
88	87. Motion in a straight line
89	88. Motion in a circle
90	89. Motion in a straight line
91	90. Motion in a circle
92	91. Motion in a straight line
93	92. Motion in a circle
94	93. Motion in a straight line
95	94. Motion in a circle
96	95. Motion in a straight line
97	96. Motion in a circle
98	97. Motion in a straight line
99	98. Motion in a circle
100	99. Motion in a straight line

\*Based on a paper given at a meeting of the Royal Society of Medicine (Motion Sickness: Current Aspects in the Treatment of Motion Sickness) (March 1, 1966).

trials have concentrated very little on the field of research.

#### Incidence of Motion Sickness

A large number of drug trials have been conducted at sea and whilst attention has been given to varying weather conditions, an inspection of the record from a most dry period (Table 1) reveals that environmental conditions at sea vary considerably from day to day. Thus the motion sickness incidence on any day might be low whereas on subsequent days it may be high. Two drugs tested on different days will give different protection rates but this might be attributable to the varying incidence of motion sickness rather than to the drug.

A reproducible stimulus is required in order to compare drugs. It is impossible to achieve a consistently reproducible stimulus at sea due to varying weather conditions. Laboratory controlled motion stimuli are however reproducible and have been used in drug trials but their tolerance and safety in the evaluation of anti motion sickness drugs have been questioned.

The wide variation in susceptibility to motion sickness amongst the population has rarely been considered in past drug trials. The distribution of motion sickness susceptibility in 300 university students appeared to be of the Poisson type (Fig 11)<sup>1</sup> In some drug trials the level of motion sickness incidence in the placebo group was as low as 4% this might have been increased with better sampling. A placebo threshold level of about 40% is required in order to make a valid assessment of the efficacy of a drug.

#### Testing Time

The testing time and the maximum drug plasma levels should coincide for a valid test of drug effectiveness. Figure 2 shows two theoretical plasma profiles with a motion stimulus given between hours 1 and 2. The peak plasma concentration of Drug A

Table 1  
Motion sickness conditions on HMS *Agility* (1987-88)

Day	000-0700	08-1700	1800-2400
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
31	0	0	0



Fig 1 Distribution of motion sickness in trial



Fig 2 Effect of testing time on drug efficacy in a drug

coincides with the testing time and thus the test is valid. Drug B however does not reach peak plasma concentration until two hours after the testing time. Many drug trials have allowed identical times between medication and the motion test for drugs which vary in their absorption rates. Figure 3 shows the plasma profile of one of the most effective drugs in motion illness

hears and hydrobromide.<sup>12</sup> It can be seen that benzene reaches peak plasma levels one hour after oral dosing and is cleared fairly rapidly from the system. Therefore any subsequent recorded efficacy of benzene as motion disease must mean that the motion stimulus is given between one and three hours after medication. Future trials must take into account the plasma profiles of the drugs when testing their effectiveness in motion disease.

### Side Effects

The effectiveness of a drug in the treatment of motion disease is not simply its ability to abolish the symptoms but to achieve this with the minimum of unpleasant side effects. The design of the drugs recommended as motion disease has been based on their design when used in the treatment of other conditions and little research has been conducted on dose/response curves for each drug in relation to motion disease. Figure 4 shows the effect of varying doses of benzene hydrobromide in preventing vomiting. This figure has been compiled from numerous trials where there were varying levels of motion disease in the placebo group.<sup>13</sup> It shows that a large reduction in the dose of benzene hydrobromide (1.5 mg to 0.5 mg) resulted in only a small reduction in efficacy (90% to 70% for 50% placebo incidence) which was accompanied by a substantial reduction in central side effects.<sup>14</sup> Further studies are necessary to confirm these findings and to investigate the dose/response curves for other effective drugs.

### Experimental Endpoints

A major problem in this area of research is the identification of a suitable endpoint for tests designed to evaluate the efficacy of drugs. At one time vomiting was considered the main indicator but due to its unpredictability with subjects it was clear that



Fig. 3. Benzene concentration vs. time after administration.



Fig. 4. Percentage vomiting prevented achieved by varying doses of benzene hydrobromide.

some of the other indicators should be considered. Investigations carried out in the new system were (Perneczky) utilized a system of diagnostic scores (Table 2) whereby a subject's state could be categorized and points assigned to the symptoms reported. In these trials scopolamine (M 101) was used as a suitable endpoint.<sup>15</sup> Using this system the

experiment is dependent on the subjective feelings of the individual under test. A more reliable method would be to apply objective criteria for grading motion illness. There is some evidence that a change in skin resistance might be a reliable post vomiting index for that this results could occur.<sup>2</sup>

### Adaptation

As most people are aware, a few days at sea will allow an individual to gain his "sea legs". This phenomenon is known as adaptation to the motion stimulus and results in diminished symptoms of motion illness. Adaptation can be vulnerable in a drug test conducted on consecutive days, as shown in Figure 5.<sup>4</sup> In this experiment the stimulus was produced by deceleration from a constant velocity on five consecutive days. It can be seen that the decrease of nausea sensation, experienced after the drug had stopped, decreased over the five days, in all four decelerations. The decrease in the effect of the motion stimulus caused by adaptation might be attributed to a drug that makes that drug appear more effective than could be accounted for by its



Fig 5. Adaptation to stimulus

pharmacological activity. In order to avoid the development of adaptation, the test intervals between testing periods should be long.

### Drug Tests

A substantial number of drug tests have been carried out on the three stimulus rooms.<sup>5</sup> In a study of 50 naval ratings the motion stimulus took the form of a cross sampled wave applied to the vestibular apparatus. The subjects were seated in the room and were required to sit down placed such that their vestibular system was taken out of the plane of rotation. The stimulus can produce the usual symptoms of motion

Table 1  
Diagnostic value of different levels of nausea & vomiting (nausea)

Grouping	Development of the picture	Stage 1 0 points	Stage 2 1 point	Stage 3 2 points	Stage 4 3 points
Motion sickness	Severe, with inhibition of swallowing	Absent	0.5	1.5	2.5
None		Absent	0.5	1.5	2.5
Very mild seas		0.5	1.5	2.5	3.5
Mild seas		0.5	1.5	2.5	3.5
Moderate seas		0.5	1.5	2.5	3.5
None					3.5
Control motion sickness					3.5

Level 0.5 = mild seas; level 1.5 = mild seas; level 2.5 = moderate seas; level 3.5 = severe seas

Grouping	Severe seas	Moderate seas	Mild seas	None
0.5 points	0.5 points	1.5 points	2.5 points	3.5 points

\*0.5 = severely marked; 1 = moderate; 2 = mild; 3 = none

alone. The number of induced head movements before reaching 50 Hz (Table 3)<sup>2</sup> was used as the test endpoint. Figure 6 shows that 0.5 mg 999 (0.01 mg) was the most effective of the sympatholytic drugs used, allowing an increase in the number of induced head movements to 35 above placebo level. Figure 7 shows the results of some anticholinergic drugs tested in this situation, all of which were more effective than the sympatholytic group. The most effective of the anticholinergic group of drugs was promethazine (15 mg) which increased the number of induced head movements to 45 above the placebo level. Figure 8 shows that of the other drugs tested in the above-mentioned tests, isopropamide (10 mg) was the most effective. In a dose of 0.6 mg it increased the number of induced head movements to 90 above placebo level. Overall the combination of hyoscine (1.2 mg) and isopropamide (10 mg) was the most effective drug treatment with an increase in induced head movements to 200 above placebo level.

Following this work the researchers proposed a mechanism whereby motion illness develops (Fig 9). This was advanced on the basis that the most effective drug treatment is a combination of a parasympatholytic drug (hyoscine) and a sympathomimetic drug (isopropamide). The proposed mechanism suggests that there are two competing nervous populations and the  $\alpha$ 1 activity in this one will influence the development of

symptoms of motion illness. An increase in the activity in cholinergic neurons and a decrease in that of the noradrenergic neurons will result in motion illness.

This model for motion illness based on the action of the drugs used in the above



Fig 7 Efficacy of anticholinergic drugs.



Fig 8 Efficacy of hyoscine and isopropamide.



Fig 9 Efficacy of hyoscine and isopropamide.



Fig 10 Proposed mechanism of motion illness.

rotation mean has not been reproduced using alternative sodium salts. The view is also open to criticism in that only a small number of subjects were used in trial a large number of drugs. The dose/response characteristics of the many different drugs was ignored, thus the testing time was not always at the optimum for each drug. The drugs were administered by 12 hours before the test which would favour the parasympatholytic and sympathomimetic drugs. As stated above, these two drugs provide the best drug response under these conditions. On the other hand the sympathomimetics would not have increased peak plasma levels and were not tested at their maximum efficacy.

#### Recommendations

From the literature on drug trials recommendations have been made as to the best drugs for cardiac motion sickness.<sup>1-12</sup> It is universally acknowledged that hyoscine hydrobromide is the best single drug but its use is limited because of its unpleasant central side effects. Table 4 lists the drugs recommended in this condition and the situations in which each drug would give maximum benefit.

With careful consideration of methodology and the basic pharmacology of the drugs under study, an evaluation of the optimum drug treatment in motion sickness can be achieved. At the Institute of Naval Medicine a research programme is being set up to investigate the effectiveness of selected drugs using a laboratory controlled stimulus. This stimulus is produced by a rotating chair with a tilt function which will give subjects a cross coupled motion which is heave and roll and which rapidly

Table 4  
Drugs recommended in motion sickness

DRUG	DOSE	ROUTE AND TIME	ADVANTAGE
SCOPOLAMINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o
HYOSCINE	0.5-1.0 mg	o	o

induces the symptoms of motion sickness. Using this stimulus a high incidence of motion sickness can be produced in the general population. The initial phase of this research programme will be designed to investigate the efficacy of the popular drug Scopolamine and the transdermal preparation of Hyoscine.

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## Around the World on Challenger

C. B. Berry

While sitting on an elderly Le Havre post carder in June 1963 I had the good fortune to come in contact with Chris Francis. In conversation I mentioned my ambition to sail around the world. Hearty seemed by her reply: my dream seemed to mean that whilst five phone calls were made and I was introduced to Les Williams, an officer in the *Round the World Race*.

The race was due to start at the end of August and by mid June I had not even mentioned the scheme to the Dent, the Royal Navy as my family nor had I anything like the daunting sum of money required as my contribution to the vast running expenses of such a trip. However, I set about the task of raising money and writing letters, during which time I was also still studying at Medical School and working on *Challenger*—allowing for all eventualities. It was not, however, until three weeks before the race that everything was finalized, the Medical School would allow me a sabbatical; the Navy would give my unpaid leave and Les was prepared to take me as medical officer—the money is another story.

*Challenger* was 80 feet long, the biggest boat in the race and she was to carry a crew of 11, a mixed but compatible group, for the 22,000 mile journey.

My job as medical officer was made easier thanks to the assistance of BHPA who provided five medical consultants and very comprehensive first aid kits to the crews of the three British yachts in the race. Each crew member was given a thorough medical

screening by BHPA, at their centre in London and their medical and dental treatment was organized by them at all our ports of call.

The medical kit was supplemented by a few small items suggested by the nearby staff at the Royal Naval Hospital Haslar and the Medical Officer at HMS Dolphin.

August 29 brought a busy day at Gosport with little rest. Crews of people flocked to the shore, or took to their boats, to bid us farewell and I remember a definite dry month sensation as we manoeuvred to the start line off Southern. The lights were flashing the huge operation fleet to keep up with us as we rounded Bokeridge Ledge and were reaching speedwell to make us past St Catherine's Point onto the Channel towards L'Île d'Orléans and the Bay of Biscay. The light was given us all the opportunity of sailing in to which course. A gentle trip through the Bay brought us to Cape Finistere where we continued south, way into the warm southern trade winds which pushed us down past Portugal to between Tenerife and Grand Canary and over the tropics.

With the tropics came the delirious seasons of calm and calmness as squalls which can feel any crew's concentration is very hot and frustrating conditions. Any puff of wind must be used to try to push the boat through the zone where the weather systems of the northern and southern hemispheres meet. That requires some very hard work as rapid and changes are of utmost importance. As one can imagine, on an 80 ft boat the work

are heavy and cumbersome. During this part of the trip I suggested that salt tablets should be taken. However, many found that the resultant nausea was unpleasant and preferred to accept that plenty of salt was taken with food. Medical officers on other parties found that greater nausea was achieved with glucose-coated salt/dextrose tablets which resulted in fewer complaints of nausea.

After two or three days of these variable conditions it was refreshing to find tall headlands heralding the beginning of the south coast trade winds which were to be our driving force from the approach to Cape Town along 1,800 miles distance. We found that conditions became much cooler as we headed into the early spring of the Southern Hemisphere. We were then subjected to about three weeks in damp conditions when, although the air temperature was quite warm, conditions dictated that clothes were worn as all water soaked. It was then that I first noticed the appearance of small painful sores on chafed areas of the skin of those at low crew members. After trying various antiseptic lotions it became obvious that without a liberal use of fresh water to clean the sores they would not heal. I therefore felt that the best policy would be to clean the sores with alcohol, unopposed rayon and protect them with a dry gauze dressing. This seriously reduced the discomfort and as soon as the sores healed. Those which persisted healed within days of arriving in the fresh, dry coast lands of Cape Town.

The last few days before reaching Cape Town were perhaps some of the most frustrating of the voyage. We had been at sea for over two weeks and were expecting a fair wind to give us a good reach for the last 800 miles all we got was sudden violent gales blowing straight out of Cape Town. Unfortunately during this time we sustained some damage to our mast and had to raise the boat on to Cape Town under reduced sail. The sight of Table Mountain early one

morning was exhilarating — what it appeared only a little closer at last! — was frustrating because a more accurate day couldn't be made. With the help of afternoon and evening forecasts we finally made it in to Cape Town at dusk, to a great reception.

With a stay of nearly four weeks in Cape Town there was time to complete the repairs to the boat, prepare for the next leg and to have a short break.

The same soon came when the boat had to be towed back always a tedious job ensuring the boat had no than a constant dry tow without getting beyond and picking the barge with his and displaced boat — all in waterproof containers.

We had a very good start from Cape Town. However the last weather light wind went against us again. Again and then north into the Southern Ocean. The first night out was spent actually becalmed off the Cape but we soon picked up the strong westerlies known as the Roaring Forties. These winds allowed us to sail in a more easterly direction but still heading south in order to shorten the shortest possible distance along a great circle route. This cannot be achieved completely as such a route would take a boat into the pole ice of Antarctica and a balance must be found between the great circle route, apparent wind and head on. Our course took us to about 47°S, although we only saw two sightings of clear quarters. We had no roller seas except for about three weeks while we passed south of the Indian Ocean and



*Rolling sea land in Southern Ocean*



Australia, life was made slightly more comfortable by the good quality polar gear we had brought before the war. I personally found that cotton or woolen gear was warmer than the synthetic fibre gear, however, the weight of most modern gear and the increased speed at which it dries makes it preferable to natural fibre clothing. The main problem on this leg was one of cold feet induced by standing on the freezing aluminium deck for up to six hours at a stretch. Many found that sturdy approved gear boots, though heavier, were more preferable in the colder than and heavy rubber boots in this respect.

The rough sea encountered during this leg had taken a toll of six patients in one or two crew members while on galley duty but the prophylactic use of Sugipon Chloral was very effective.

Other medical problems on this leg included a number of minor cuts and bruises due to the rubber master and at times, violent storms of the boat on the water along at over 30 knots. A fairly constant problem with some crew members was reflex emphysema which I put down to repeatedly rising rather large wadgy meals and then returning straight to bed before the next watch — the problem was solved by keeping a large tub of Colford around which readily available.

Towards the end of the leg when we were still well south of Tasmania but beginning to turn north into the Tasman Sea towards New Zealand, there was some mild discomfort amongst the crew. The intense cold and damp which had been with us for a good three weeks had begun to wear us down. I think the two things which kept us going were the fact that we were always busy on watch and also that we did have a supply of power 3 men on board — this acted as a lifeline on several occasions when the crew were down.

Our last downward sailing was brought to us and as we approached New Zealand, the

sea blessing us with its warmth but taking away the wind — you can't have everything! Again a long and frustrating approach to port along the north coast and down the east coast of New Zealand to Auckland.

We timed our entry to Auckland perfectly choosing a fine sunny Sunday that noon when there were barely thousands of people on Marsden Wharf to welcome us as along with the French yacht *Exeter II* which had crossed the line eleven minutes ahead of us.

The hospitality of the New Zealanders was outstanding with offers of accommodation, food and washing coming from all quarters. Unfortunately our stay was relatively short (three weeks) and as we were leaving on Boxing Day all the work had to be done before the Christmas week. At this stage I also took on the job of caterer — not one I relished but I think it was felt that, with my love of eating, the job should be assigned to me. The job was however made considerably easier by the arrival of a new crew member, a New Zealander by the name of Warwick who as part payment for his trip, provided us with one of his, batteries, slaughtered, butchered and frozen. When perked on dry ice in chillboxes this provided us with fresh meat almost every day on the third leg.

Unfortunately we saw the retirement of the yacht *Savannah Story* in New Zealand owing to financial problems. Their doctor, Major Hugo, had been offering a medical



Challenger and crew in the island harbor during the 1950.

radio screen and although I never had cause to use it, it was reassuring to know that expertised help was available at the other end of the phone. This screen was taken over by the doctor on *Argo Viking* for the latter part of the race.

After spending a most enjoyable Christmas on the beach we left at 1300 on Boxing Day through an Auckland harbour where with the noise of thousands of spectators on deck. The action of the scene on this glorious day was the Whitbread fleet, all under spinnaker, heading me to sea — quite a sight and I gather that all the minds surrounding the harbour were joined with spectators watching the fleet a land forward!

Once again we sped south but our works on our summer conditions were not quite so severe even though we went down to 50°S. Also again we renewed with three new spinnakers on board to replace those badly damaged from the storm by which our main sail being repaired than being set. There was hope that we may have been able to push the boat a little harder than had been possible previously with our main and working. We also had a new boom and a new masthead both of which had been severely damaged on the second leg. The sailing was similar to the second leg with the downwind sailing sailing down the regular westerly sea in squalls extending 30 knots. The crew seemed happy on this leg owing to the hot warm weather conditions and possibly also because the boat was of a much higher quality than previously for certainly kept me happy!

Our last night of land came some 20 days later when on the horizon we spotted the glaciers of the Southern Andes in Chile — needless to say it was a flat calm with light easterly breeze blowing strong on our first day without clouds for some weeks. The boat itself is a ride on the eastern up of a group of volcanic cones, at Tavea, at Fuego a beautiful but daunting coastline.

We entered the Atlantic and turned north through the beautiful but choppy Malé

Strait, passing to the west of the Falklands and on to Mar Del Plata in the mouth of the River Plate in Argentina. "A good job you were: there six weeks later" was the passing comment on return to UK and so here we had our longest stop in Argentina with some five weeks to occupy. I must say that during our stay we all found the hospitality overwhelming, indeed a very kind family host a friend and I a first in La Plata for ten days. However, perhaps this is not an appropriate time to pass views on Argentinians to its people, suffice to say that Mar Del Plata was by no means the favourite stop during the race and most crews were more than ready to get off the home at the end of the stay. My thanks must go to the crew of HMS *Endurance* who visited Mar Del Plata during our stay. I think they earned the name of the largest yacht maintenance vessel in the South Atlantic.

From here, north to the Equator, keeping offshore where possible to avoid the colder currents off Brazil and to find the southerly made winds which were to give us heavenly close reaching until we once more met our friend, the doldrums. Close north we found enough rain to completely refill our tanks in one shower and the crew was drier than ever before. One quart of the doldrums we again picked up steady warm winds though still hot flying fish which do make a welcome change from porridge for breakfast.

The Azores was when our luck ran out. Firstly we were becalmed in the Azores high pressure system and when we did finally find a light headwind about a hundred miles north of the Azores, a cloud parted and the mast broke at deck level. It became clear that we could not recover any of the mast and so it was cut away to avoid damage to the hull. The mast had broken at 10m/30ft by daybreak the clouds were clear, though covered in slippery hydrocar and we were ready to host a jury rig. There is little scope for a large jury rig when the

stair in between at deck level. However, we managed to keep the main beam in a horizontal line using the two approximate poles in a fixed gravity chain because a constant must be provided as much as rather constant length by the mounting the reference line. I guess that several smaller cuts we could not along at right angles in a month, although the wind conditions enabled us to move only one horizontal meter in the first three days after they had deteriorated — however, the

being at this stage in the journey having completed over 26,000 miles and with 500 more to do. We all became experts at crab, backpacking and even the most fervent non-readers and writers took to book and pen.

At last, more than a week after the storming, we called up the Chavos as the Task Force noted our flying over more operations in a thick fog against the tide in the early hours of a cold and wet January morning.

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FRANKLIN BARRETT, THE HISTORY OF  
NARRATION FROM NAVE AND MARTIN  
BARRETT, Edited by: W. J. F. Fennell, B. A., F.  
Fennell, Pp. 276 London: National Maritime Museum  
1964.

This intriguing volume provides a wide cross-section of a unique experience held in the National Insurance University, Liverpool. The brief, crisp exposure of the medical and educational components, combined with high related information for historical interest, has produced a book which is of an excellent format for all social medical students and medical support staff. It is destined to become

The presentation set forth will be relevant and complementary. The book again sets a challenge to living Christianity in Africa and raises the question as to the nature and the commitment. Systems of education are described which illustrate various social changes in the culture that highlight the changing situation that have been made in recent years. The chapter on Church Administration of African Churches will be an important and appropriate work added to both students and readers in a B.A. programme in Africa and the world scene.

[illegible]

For the third time that year, residents' apprehensions were related to the problem of industrialization. In 1961 a few regulations of local government of about ten towns, cities, and villages were still implemented, and the situation seemed to be relatively harmonious; but in 1962, especially in Tientsin and Chongchuan, as planning and control were not in the picture,

The book concludes with chapters on the *Shylock* syndrome in the Court of the Divine Madness and the *Shylock* syndrome of the National Council.

[illegible]

The paper's perfume is well described and named and the fragrance is as apparent as a whisper of the, otherwise cold, white wall paper it is resting on.

First, the fact that the Israeli would frequently negatively affect the national culture and society would not be sufficient to justify the implementation of a new national identity.

**Living Time Dictionary**, Edited by, Roy  
Harris. Pp. vii. Living Time 1970.  
Distributed from LTT-20.

They are not limited to America, where they, more so than elsewhere, are viewed as a major cause of the country's economic problems. In Europe, too, the Commission's report is being read with interest. In Britain, the Bank of England will certainly be a witness that the need for a currency union is not a purely European one. And, as the report is read, it will become clear that it is not a purely European one. It is a report that will be read with interest in all the countries of the world. It is a report that will be read with interest in all the countries of the world. It is a report that will be read with interest in all the countries of the world.

The authors very convincingly document and describe the reasons for the different results in all age groups, as pointed out by the reviewers. Included are such aspects as, for example, that postmenopausal women are exposed to increased cancer risk, but that this risk is not elevated in women who have had hysterectomies. In addition, the authors point out that the results of the study may be different in other populations, such as in those with a history of breast cancer, and that the results may be different in other populations, such as in those with a history of breast cancer.

[illegible]

## The Nursing Process — An Individual Approach to Nursing Care

M. E. Williams

### Introduction

Since the advent of salient hospital disciplines have been cynical about advances in nursing, suspecting that such new concepts will divert the nurse even further from the bedside. The Nursing Process is no clearly stated in the opposite direction, however, that we hope all doctors may soon come to accept it as a real improvement in nursing technique.

On February 1, 1980, when the Nursing Process was introduced into all medical hospitals it had a very mixed reception, many medical officers for instance, regarded it as overblown and an unnecessary addition to the bed ticket and not every nursing officer greeted it with unqualified enthusiasm.

I was badly prepared for my own introduction, in 1977, when I attended the first British conference on the subject. I had read a little about it in the nursing journals but had not related it to my own work and I found the terminology most too complex. The Nursing Process had been practised in America and throughout the same year before it arrived in Britain and most of the references were American and full of deeply obscure ideological jargon written by career nurses with multiple diplomas.

The first conference made me realize how difficult it was going to be to convince others of the importance of this new nursing approach to patients. When the General Nursing Council initiated the syllabus in 1977 so as to make it a requirement for all nurses to study, our problem was heightened

as we had to make a success of it. It became apparent that implementation was going to take several years and we had to ensure support from all the medical, nursing and auxiliary services.

The Nursing Process is divided into four main stages: (I) the patient's social and nursing history, (II) making a care plan, (III) implementation of that care, and (IV) evaluation of the results. In other words, nurses are encouraged to consider the nursing needs of the patients in individualized and to consider them, and their relatives in that care.

### The Social and Nursing History

The first stage is an attempt to define the patient's background and his daily life in some detail as his waking, sleeping and elimination habits, where he lives and work, where his degree of mobility and so on. It is also an opportunity to talk over his worries, problems and fears, perhaps those related to previous admission to hospital.

The same history evoked an unexpected response as it was found that doctors view this as interfering on their own medical history-taking. This was never the intention either that the two should complement each other and give a wider view of the patient.

Another criticism has been the time involved obtaining this information. With experienced nurses manage to elicit much of this information at the bedside, while helping patients to settle in during admission, observing them and talking with the relatives. It does not have to be done

immediately on admission, but should be completed during the first 24-hour period following admission, with all members of staff involved. The length of the patient's expected stay in hospital must be considered and, despite some very enthusiastic day cases are not usually expected to answer all the questions.

In the of any value, the information gathered must be written down and read by all staff involved in that patient's care. Documents completed properly and used effectively save time in the long term.

### **The Nursing Care Plan**

The information obtained in the social and nursing history forms the framework of the nursing care plan.

On the whole nurses are wary of committing themselves in paper for fear of rebuke. Their previous nursing has always been to follow orders in verbal orders of doctors and to work under the supervision of trained nurses who have not always had the time to explain. Doubtless newly qualified staff and nurses under training are being expected to discuss, make decisions and consult themselves in writing a nursing care plan based on the patient's social and nursing history.

The patient's discharge from hospital and his return is planned from the date of admission. The nursing care plan details the most effective way of discharging him, so time and resource discussion with the patient and his relatives about where he will go from hospital, what level of care he will require and who is qualified to give it. The care plan complements purely medical skills in a new and individual approach to patient care that we believe to be a significant improvement on older procedures.

Primary objectives is now the accepted practice in hospitals and within it the Nursing Process is remarkable. A team of nurses responsible for the total nursing care of a group of patients, has many advantages, the nurses know their patients better,

they can anticipate their nursing requirements and plan a programme. They can recognise potential problems and take action to avoid them; patients can share in their nurses' and relatives' final consultation in continuity of care. The nurses' ability to give accurate information about their patients in a confident manner is most helpful to medical staff.

Some ward nurses were worried initially by nurses becoming responsible for things being done plus and by their close relationship with individual patients, losing dependence of their own role and loss of authority. Most experienced nurses realised that far from being a threat, it gave them more than in the ward and better opportunities for working. Additionally it improved communications between nurses and physiotherapists, dietitians, chaplains, laboratory technicians and all the others involved in the care of each patient.

### **Implementation of Nursing Care Plan**

Once the plan of care has been decided, the nurses, together with the other staff involved can put it into practice. Usually this is straightforward working and because it is written down everyone concerned should be immediately aware at all times of the day or night what care has been given and what is required. It also highlights any problems and is referred to that particular patient. For those patients requiring a more complex care plan it is this individual approach which must concerned itself to all staff concerned with the welfare of these patients.

### **Reevaluation of Care Plan**

Execution of the nursing care plan should be continuous and any changes necessary to meet the patient's progress to final discharge should be implemented. Discussion among the nursing team is of value and the opinion of doctors and auxiliary staff may be sought in some instances; the patients and their relatives can make a contribution to these discussions.



## Australia and Around the World\*

D. P. Gould

We went on our way to Australia. Four of them in a cabin on a very tightly fitted troopship. As water for washing purposes was only available for as long as ten every day, showers had to be carefully rationed. Despite these little restrictions we got on very well. One of my cabin companions was a Merchant Seaman master mariner, a man slightly older than myself and extremely widely travelled and experienced in the ways of the world. He was exceptionally well educated and amongst other attributes had a marvellous flow of maritime language. Most people were very impressed by this and I found it especially odd that in their minds they had never heard him speak.

We went to make our passage across the Atlantic in the Panama Canal and then across the Pacific to Sydney. We were encouraged but were also to proceed at a fairly fast average speed and within a very short time we seemed to experience the thought of attack by enemy craft. The only time we was reminded of this possibility was when we assembled for the (possible but necessary) boat drill. There were some ladies on board and, of course, there were the usual shipboard romances. The most remarkable of these was between a young Sub Lieutenant and a VAD. They were absolutely inseparable and even in the intense drilling hour of the Panama Canal command looked at each other's arms. I noted with some interest that some of these

ladies were permanent looked. The only marriage that took place as a result of the voyage was between a very senior Commander and a senior member of one of the women's services.

It was interesting to see the Panama Canal with distant views of the towns of Cristobal and Balboa though we were not able to sample the scenery. The boat while going through the canal was minute and we could only think of the hundreds of tons which had been lost during its construction, chiefly due to the scourged yellow fever and mosquitoes to this effect appear along the course of the canal.

We sped across the Pacific Ocean and eventually arrived in Sydney some three weeks after leaving Liverpool. Our passage had been entirely dry so that considerable attention was paid to finding hostesses, sewing classes. The Sydney police were most accommodating in this matter for they allowed the public buses to open despite it being Sunday a day upon which they were usually closed. We went into one bar accompanied by the Staff Captain of the troopship, a man of most gentle manners and a great favourite with everyone. He had a very red face with a good expression and resembled closely the subject in Melba's famous picture 'The Messenger'. Drinks were ordered and everyone seemed especially alert and sober-minded while the Staff Captain stood on the bar and drank the Sea drink. He said that he had started it properly and so was handed another and having washed him every possible kind of success, good and happy day began.

\* Previous arrangements approved in Vol. 66(2) 4571 et. 13 and 1466/5

We were accommodated at first in various floating bungalows and hotels. I was first based in an hotel near Sydney Bridge but quickly transferred to another larger establishment near the centre of the city. It was extremely difficult to get anyone to clean shoes in Australia and the main servants did not like holding or touching pyamas. One of our quarters was in a hall one evening and struck up an acquaintance with a man who said that he had been until recently a major ball player but had had to abandon his profession because of heart disease. My colleague asked him if he would like a job as night porter on our team to which he replied that he would be absolutely delighted to come and work in such an atmosphere. This appointment was a great success. When one asked this man what name was better how his health was he accurately replied 'Well, doctor I'm suffering from a heartache from the waist up and a lumbago from the waist down. On entering the hotel at night we inevitably took off our shoes and handed them to Leila going up to our cabins as our stacking order. There was an automatic broadcasting system in the hotel which could be switched on from behind the desk and in at night someone would engage Leila in conversations at the reception desk and when he got truly going another would go round and switch on the broadcasting system. The roar of laughter from the hotel bedrooms was something which I shall always remember.

The medical team, who had travelled out in the hospital were supposed to form the nucleus of a naval hospital in Sydney called *Herne Bay* while we were to proceed to Brisbane to take over a hospital there from the American Army Corps. It is happened that the RN medical officer who had been sent ahead to make the necessary arrangements had been very slow in arriving in Australia, in fact getting to Sydney only a very short time before we ourselves

arrived. The reason for this apparently was that he was an Acting Surgeon Captain and by some clerical error this had been translated as Acting Surgeon Captain. He was accordingly given instructions then and procedures suitable for an NCO.

The Sydney team was almost ready for operations and the hospital there became a going concern in a very short time. Brisbane did not have such a high priority and my group had to remain in Sydney for some ten weeks before proceeding to Brisbane. I did not mind that at all as I continued to live at the mess, which I liked very much, and was allocated a jeep for my own use. My title was Naval Medical Liaison Officer Sydney and my duties were multifarious. The fact that I had independent transport made me extremely popular with quite a number of people. There was a great deal of hospitality in Sydney. The water boards in the mess were stocked with provisions to spend weekends and other periods with families in order to sample Australian family life. Apart from this the mess entertained almost two of the two leading nightclubs. One of the problems was that it was not possible to get a taxi in the city of Sydney after 11pm this being the law. One could of course get a black market taxi but the fares were naturally very high. On one occasion a group of us decided to take to one of the nightclubs some young ladies whose families had given us considerable hospitality. I arranged for taxis to pick us up at 11pm but of course when that time arrived none party had an intention of leaving the nightclub. I went out and tried to persuade the drivers but they told me that the law required that they go home. I was rather upset about this as I did not want to disappoint large sums of money for illegal taxis and was also anxious to get the girls to their parents' doorstep at a reasonable hour. Next to these problems I was phoned up and down outside the nightclub when an American General came over and asked me



why I looked troubled. I explained to him my difficulties whereupon he said "I've got a interview about the cinema and a chauffeur. I'll drive anybody any place". I thanked him profusely and went back to his nightclub to inform the party of the situation, asking them to be decent enough to come within a reasonable time as the General was waiting. He was accepted as his word — he drove all five girls home and had a drink in each home on the course of executing his duties. I wrote him a letter of warm appreciation the following day.

Sydney is an attractive city and to me one of the most striking features was the beautiful hair of the young women seen on Martin Place, George Street and Pitt Street as they came out from their work at hairdresses. These women seemed full of vitality and zestful and our rarely saw a head of shorn hair. It being December and the middle of the Australian summer they were of course wearing cotton frocks and it seemed to me that the standard of good looks was very high. The girls were taller and slimmer than those seen in the average British city but one missed the powder and smart conspicuous skirts and flaps in some areas of the British Isles. The men appeared to wear rather formal attire consisting of the hat and I made various enquiries to discover the reason for this. I was told that they could not wear loose knit jerseys of the leisurely problem and if they began to wear light clothing it would depict the Australian weather trials. The last reason I was given was that they might get caught out with a "sundrily" in a country of informality there were certain extraordinary accommodations. The clubs were extremely cautious about offering honorary membership. The senior clubs gave this privilege to officers of the rank of Commander and above. One of my colleagues and I were invited by a rather important personage to dine at his club but we explained to him that as we were only

Lieutenant Commanders, we were not entitled to be honorary members and it might therefore be embarrassing if we were to appear as guests. He changed the venue to an hotel where we had a most pleasant evening but the next day we received letters from the club secretary inviting us to visit ourselves of honorary membership.

Life was quite expensive and those of us with families and children to support as the United Kingdom had little spare cash for material was to be placed in a difficult position. I read a good deal in my cabin and one day while talking with the Fleet Postal Marshal a very interesting and amusing character he told me that I looked a bit depressed and asked if anything was lacking in my life to which I replied that I would like to learn to swim and attend university. I thought little more about this but a couple of days later he informed me that on the following day he had arranged for me to attend for dinner at a house on the outskirts of Sydney where he said the conversation would be good. We went on the Fleet Marshal's car and on arrival at this beautiful home I found that he had been as good as his word for all the other guests were definitely to be found in the "Who's Who of Australia". I spent a wonderful evening. One of the things I do remember was that although there was no domestic service in Australia my hostess remained with us throughout the evening. On making enquiries I discovered that it was the custom when one held a dinner party of one was to use a next door neighbour's to help with the washing up and other domestic details so that the host could be properly enjoyed. I think this is an excellent idea and if next door neighbours are so sufficiently good terms it could be widely used.

There can be few cities with a situation equal to that of Sydney for one could take on sleeping time in any of some fourteen destinations and at the end of the train ride there would be an absolutely glorious night

boats. The only problem in the presence of the ubiquitous shark. At the great beaches such as Manly there are bath-out towers and shark systems which safeguard the bathers but in the Sydney area there are also cafeterias where one may enjoy excellent swimming and get his completely safe from the dark outside.

In due course the time arrived for our departure for Brisbane. We travelled in a hospital bus, an extremely comfortable and pleasant method of progression. There was 1 lecture, some classes in the General Convention which stipulated that we should spend a certain number of hours each day actually in bed and we found that compliance with this particular stipulation was not an arduous task.

Our first impressions of Brisbane were disappointing. The town was much smaller than Sydney and looked very new. Many of the houses were built on stilts. The hospital staff was as the country, a few miles from the city, and was occupied by the Australian Army. We were to share this hospital and our own hospital, which had been left by the Americans, could be made suitable for occupation. The conditions under which the Australian Army officers lived were not up to the standard to which we were accustomed. We felt they would be susceptible to sun and light in the living hour but, as there was a great many miles from any form of humidity, there was no reason at all why we should not enjoy a medium of climate. We were allocated double cabins which were extremely small and the chairs in the mess were the custom variety on a wooden frame. We were able to get some decent sandwiches from canteen sources which our Australian colleagues thought rather efficient. Food was another problem. The Australians ate great meat meals and are accustomed to drink for breakfast. Most of us were very keen on steak, but breakfast was just not the ideal time to appreciate it. It got to know the Australian lady suggest to

chairs, of the dining hall and arranged that we could attend a little later for breakfast and have bacon and eggs instead of steak sandwiches. We got us very well settled with our Australian colleagues, many of whom were persons of considerable professional distinction. They were amazed at our habits, and I must say that this amazement was often fully reciprocated. One of the interesting things was the considerable observance of the Americans for gambling. I remember going to a rugby match with some friends when my host wanted to bet on each kick or pass. When I found that my predictions were almost invariably correct so that the Australian bettors, in the public, became rather heavy. I became rather embarrassed. Eventually a very fine place holder was about to try a goal from a comparatively easy position so I told my host that I would bet him everything I had in my pocket that he would miss the shot. It looked most unlikely but soon it he did and my winnings were far enhanced.

There was nothing much to do in the evenings so I enrolled in a course at the University of Queensland to prepare for the degree of Master of Surgery. The classes started after dinner and, after a certain amount of professional work, carried out in the considerable heat of the day, it was exceedingly difficult to be reasonably alert in a class at 10.30 in the evening. I used my best but I don't think that my performance can have been very impressive. At the same time I had been to one of the numerous examinations for the Fellowship of the Royal Australasian College of Surgeons. I made enquiries and found that I could be eligible to enter for the examination on my own subject of ophthalmology. I had been reading quite conscientiously for some time and was given permission to proceed from Brisbane to Melbourne for the examination at the Royal College where I found the examination to be extremely sympathetic.

The hospital which the Americans had

hospital supplies were always ready for every emergency. In this particular instance the atomic bomb was dropped on the city of Hiroshima. I will never forget the announcement on the wireless and I can still hear the voice crying: 'Last night one of the new atomic bombs was dropped on the city of Hiroshima. It is believed that the city is being razed to the ground.' About two days after this the Emperor of Japan declared to his people that the war was not going well and he thought he should surrender. My Surgeon-Captain who like myself had some experience of Hong Kong, suggested to the Medical Department in London that we should go direct from Birmigham to Hong Kong to open up several hospital facilities there. This was approved and we got out for Hong Kong in a sort of transport aircraft carrier taking with us complete hospital equipment, beds, ambulances, medical stores and, of course, the necessary personnel. The voyage north was very interesting, passing through the tropical islands, seeing the coast of Borneo and eventually reaching the China Sea where I saw again the Chinese ports for which I have always had a great affection. In addition to our party a Chinese gentleman was on board. He was a marine engineer and was proceeding to Hong Kong on business. I was interested to hear one of my colleagues speaking with him in perfect English and explained certain English words. A short time later I talked to the Chinese gentleman myself and found of course that he spoke absolutely flawless English. He told me he had received his marine engineering education at the town of Workland in Wales in Britain. I remembered seeing a tall Chinese passing my school when I was a boy and in the establishment I was able to tell him, many years he had spent in Britain and the area in which he had lodged. We became good friends and on our arrival in Hong Kong he asked me to spend the weekend with him. On the Saturday night he asked me what I normally

did on Sunday morning, and I told him that if I could I went to the early celebration of holy communion. He said we would go together and next morning we went to the church where to my surprise I found that he himself was celebrating. Our friendship became among other things, he was an ordained priest of the Church of England. He later abandoned his own engineering and eventually became a bishop.

On arrival in Hong Kong it was perfectly obvious that the old hospital in Wanchow was well in further disrepair. My Surgeon-Captain made a bargain with the Director of Medical Services, agreeing to repair and render operative one of the large government hospitals in exchange for issues of two floors for our purposes. This hospital the Queen Mary was situated in Pokfulam and the two floors which we had were very sufficient for our needs. We had a most happy liaison with the Chinese medical officers. They had the clinical material and we had the instruments and equipment so that we spent a good deal of time operating on Chinese patients in the Chinese portion of the hospital. Sometimes when I see an advertisement the marvellous illuminations of Hong Kong harbour by night I recall the conditions at the time of our arrival in the autumn of 1942. The entire electric power for the island of Hong Kong was provided by a submarine. On Peak Road there were about five candle lights and eight other night we saw one, or two added and there was illumination in the streets. There were very few lights in Queens Road or Des Voeux Road and very few people walking about the town. I stood on the middle of Queens Road one cool morning and could only see about eight people, eleven today one would probably be able to count a thousand. Everything that I had known before the war was still there and gradually, due to the remarkable ingenuity and industry of the Chinese, things began to return to normal so that at the end of six months post war Hong Kong had practically

been retained. It was a wonderful opportunity for making a fortune. One could rent a floor of offices in a building, and one month later find that one could let each office for much more than one was paying for the whole floor. There was a house for sale on a somewhat damaged site which I felt that my life savings would just about purchase. I was dissuaded from thinking seriously about this as it was pointed out to me that the British Government had given India, and Burma and eight well-known Hong Kong to Generalissimo Chiang Kai Shek for his services during the war! As usual, I refused and stayed put.

After ten months my wife and little son were allowed to join me in Hong Kong and we got a flat in Peak Mansions which had been a luxury block before the war and in which I had spent many pleasant evenings. The flat was new, furnished, looking in luxury, having been built down up by the Dockyard and furnished from steel wastes. Now I was delighted to have my wife and child with me and to have a home once again. It was interesting to note my friends who had been in prison camps during the Japanese occupation told us how they had changed. Many people were unwilling from chronic delinquency and a possible reason was simply a loss of control values which was only compatible in a very few cases of sheer madness. The Japanese soldiers were still walking about the streets under escort and just remarkably smart uniforms. War trials were taking place all the time and huge numbers of Japanese were concentrated in camps.

Before the war was halfway toward the end of Hong Kong was probably safe but now in 1945 there were warnings of people being attacked by sharks. It was thought that this was due to the jamming of boats of escaped prisoners at sea. The Japanese had built a large war memorial which looked like a small edition of an Egyptian pyramid. After a short time this was blown

up and there were some wonderful photographs of the pyramidal disintegrating while suspended in mid air.

The cost of living, though cheap by the standards of today, was very much higher than it had been before the war, and one had to pay more for the utility of a gas of three times for the making of a similar gas in 1937. My Sergeant Captain, very kindly permitted me to do a certain amount of private practice and it was increasing to every two or three apartments in a nursing home on a Sunday morning for which one would be paid rather more than for a fortnight of casual visits. The Chinese in an excellent position in that he progressed and appreciated. On one occasion I sent an account to a man on whom I had depended and he sent the money in a parcel in Hong Kong by a messenger locally, as well as the cheque for rent on a small parcel which I found contained American dollars and a short polite note saying 'I think you charged me too little and I am venturing to add these American dollars in gratitude and in hope that they may be useful.'

The police force of Queen Mary Hospital were brought up from the Dockyard and were Palestinian. The sergeant was a magnificent character but one day I finally asked him why he had not been promoted to Crown Sergeant? This was a hard question for after that he kept following me and asking me to advance his claim. His constituents would arise at the same old day a week saying 'when he described us as "nice good fellows" every' and clapping. He had brought bunches of flowers for the wives and, on the occasion of more generous proportions than her parents, he used to buy her a bunch of flowers which was given in check. The sergeant was useful as he interpreted and on one occasion I received a patient from an RFA, after not of whom it was impossible to get any information except the words 'Roman Catholic'. I thought he might come from Goa and had him questioned in

From 1947, it will seem I then had the maps on display in my Hindustani clinic and certain other districts of the Indian sub-continent but we never gained any information beyond the regions which he had mentioned at the beginning. The surgeon had become very impatient with him and with a gesture of impatience to me: "Why are you always proper?"

The Surgeon's next case was to try to get me to consult the Crown Surgeon (nearly fifty above him on the list). The first case he brought to me had an unusual disability and I managed to do something on the occasion as the man was very anxious to go to India. The next one produced was brought to me in a wheelchair but neither I nor my colleagues could find anything wrong with him as we told the surgeon with respect that nothing could be done in that particular case.

I went to a conference at the Dockyard one evening with several senior officers and as we approached the Dockyard gate my colonelment I saw my surgeon. He stopped the car and began to talk to me through the window, taking no notice of the other persons and vehicles waiting beside me. I saw a detailed account of his close work, daily in the Colon. I eventually went to the Dockyard when produced the survey but and just not a moment as to when this surgeon was likely to be produced. When I passed the information to the surgeon he seemed to question me with the best interest.

A Chinese ophthalmic surgeon wanted to make a study tour of America and England and asked me if I would look after his practice in the afternoon. I obtained my Japanese Captain's permission to do this and while the working conditions were extremely severe the first income and the family income. I nevertheless found a great deal of time on my feet and was able to earn a few Hong Kong dollars. The local press began to send me patients for consultation, and they eventually asked if I

would be so kind as to take the Navy and stay on in the Colony. These matters for me was that usually if they were a patient for consultation they were solely to see him again. I found that returning the patient with an appropriate letter in the United Kingdom manner was very much appreciated. The family doctor was responsible in as much as he could advise on the appropriate time to change — but did not want to overcharge a poor person for a return person would feel obliged to return for only a small amount. On one occasion a local doctor telephoned me regarding a patient whom I had seen at his request and asked me how much I was going to charge. I told him that I would be his adviser on that and he mentioned a figure which was several times that which I had in mind. He said he was sorry that the fee was so small but the patient was the son of the Hon. I wife of a rich Chinese. He asked about his wife. He told me "and had this been the child of one of his grandsons it would have been much more profitable."

In order to converse with the patients I thought it would be a good idea to have a certain amount of Cantonese. During the course of my stay I had several random bits of which were very amusing, and I managed to acquire a certain amount of phonetic speech. The orthography is an impossible task, it would take many years, but it is, surprisingly easy to pick up a knowledge of everyday speech provided one goes the "long" way. This enables one to deal with the servants in one simple questions of a patient and to explain what a wrong. One teacher told me that he would contract me entirely free of charge and as mine I should contract him how to behave as a perfect English gentleman. He was naturally extremely kind and I should love to have met the teacher from whom he had acquired the knowledge of English which he already possessed. He used to take me to the Chinese theatre, explaining the symbolism and music which made the performance



# 63 Years Ago — The Journal of the Royal Naval Medical Service, Vol 1

T. F. Oliver

A few general notes about Volume 1 (Editors: Fleet Surgeon E. C. Minto R.N. & W. L. Martin R.N.) may be of interest. It contained 542 pages, an average of 128 per number (today's volumes are 280 pages!). The subscription was 18s per annum at a time when a Surgeon's pay and salary was 14s per day (in 1982 £5 per year and £14.68 per day). Only two numbers contained illustrations, the first on the topics and scope of the proposed journal. The second entirely devoted to the Naval Medical Component Fund. They appeared on pages 81 and 403, neither page being the first page of a number.

References to the literature in our contributions were very rare. They were given a number in the first block referred to in the body of the bottom of the page.

Probably the best used page of our current journal is that appearing under *Naval News*, namely "Notes" — which may be why we are short of copy from time to time. The wording of this varies from the original volume only in one respect, the substitution of medical and dental staff for the literary and naval officers. The first mention of actions of battle, marriages, and deaths was also omitted in Volume 1. No births or marriages were recorded and I personally have no recollection of having seen one in the last 28 years or thereabouts.

It is impossible in this short text to do full justice to the officers who write and compiled Volume 1. The breadth of subjects is amazing. We have I believe a great deal and a fine tradition to live up to.

## Schwartz's Papers and Photographs

Not surprisingly many of the original articles, abstracts and clinical notes are related to the war.

No 1 starts with a 46 page article (with 4 *Preliminary report of a committee appointed by the Director General of the Medical Department of the Navy, in December 1914 to inquire into the best method of treating wounds sustained in action, especially during the early period after their infliction.* The committee consisted of Sir W. Wilson, Deputy St. C. B. F.R.C. Consulting Surgeon R.N. Fleet Surgeon F. W. Brown Smith C.B. R.N. and Mr Arthur Edmunds F.R.C. Consulting Surgeon R.N. the article continues no less than 14 full page photos of photographs. It also records the first clinical experiments to appear in the Journal. The difficulties of extrapolation between animal results and man are noted.

*Experiments have also been made on guinea pigs and will be abstracted in connection with certain anaesthetics. It is the no longer easy to derive experiments corresponding to wounds on man in small animals like guinea pigs, the character of the subcutaneous tissues and the whole organism are very different, and they do not seem to be the most satisfactory for evaluation of the tissues on man. In the case of man the subcutaneous tissues which we have to do with in clinical practice are extremely local in appearance on the early stage and frequently draw themselves in setting up various kinds and degrees of local inflammation, and are thus accessible to local treatment. We think however our experiments so far as they have gone under the head of the various*

#### *Incident*

No 3 commences with *Report on the wounded on the action between the Aquary and the London by Surgeon Leonard Derby Royal Australian Navy, Junior Medical Officer of HMS Aquary* He opens:

*At 7.30 am on November 9 1944 I heard a rumour that a strange warship was in the channel to Doris Island (Jelly make datum) This was unexpected and though we had had many false alarms previously reinforcements were sent to get a warship before and prepare for action*

#### *Lower*

*The London was hit at mid water five or ten minutes from the commencement of the action the first wounded man was brought below to me by the winged gun crew the winged parties being instructed not to go on deck during the action waters down, ordered. The first man had a fracture of the right leg and thirteen shell wounds. He was in great pain and I gave morphine while the anti shock treated to attend to the wounds and put in a splint rapidly because now a complete number of wounded men came down who required urgent attention*

#### *and upper*

*Great fire raged at 11.15 am. after we had been working for half hours in a roughed atmosphere of a temperature of 100°F*

*The warship was estimated about 2000 yds of which were within and in pain. The second dose of morphine in an hour has done for him but only slight relief and there was reason to suppose that the substance in the pills injected had decomposed. Fresh doses of morphine were administered and a few more were sent down in the various rates as thought fit*

*Real details are given of some of the*

wounded treated both from the Australian and the German ship by their landed on North Keeling Island

*The London was loaded with young sailors it was such obviously that we could work about her deck and she was graced with fire*

*No quarters can do justice to this and smaller vessels — they need to be read and reread on full*

*Another article by Staff Surgeon A. J. Howell repeats the action between the *Pygmy* and the *London*:*

*As a result of this action which took place in September on the morning of September 26 1944 24 men of HMS *Pygmy* and one minor vessel were killed and 8 officers and 49 men wounded. Of the 7 officers and 25 men admitted to the European hospital 2 officers and 4 men died the same day. Subsequently 8 more men died of the wounds*

*This paper gives a short account of the 34 rescripted patients*

*but described particularly was of right temporal region below middle of spine depression discharges and wounds no fracture of foreign body found but patient has complained of pain on their suspension there was no blood in places or sign of drug injury the superficial pressure beyond of pain of both thighs. Later a pain and a half of general fluid was separated from right side of chest and X ray examination showed fracture of sixth rib and foreign body lodged in the side of body of the second double ribcage. The foreign body is still retained and the patient has retained this*

*Also covered is The French Sea Action of January 24 by the Staff Surgeon of HMS *Pygmy**

#### *First Aid*

*In The real importance of efficient training of naval ratings in first aid*



Surgeon-Generals J. G. Powell RN writes:

*We regard the benefit of such material that were made. In 1961 the Maritime Committee had about twenty warships around all of which are well equipped to meet medical requests. Among them must be included adult complement ships making four (two of which) be assigned during war. The medical staff with their associated duties to remain below in three stories as long as the ship is fighting, should a fall in casualties may be possible if to come up, but their value after the action is so great that it is deemed undesirable to expose them to danger while the action is in progress. That at the start it becomes obvious that the immediate removal of wounds will have to be carried out during action by the ship's surgeons.*

*is badly wrong.*'

### History, Qualifications and Specialisation

Historical records on emergency medicine is not general from the early days — in this volume *Desert Land* papers of naval surgeons and Dr William Bruce Simpson to HMS *Hector* at the Battle of Toulon. On the latter it is noted:

*Dr William Bruce was an assistant of the Royal College of Surgeons, which was founded in the year 1583, one of the bodies which preceded in the old Companies of Surgeons. He did not acquire serious qualifications as we should call it in their days, and he had practically finished his career, never he became MD at the University of St Andrews October 18, 1817, and on December 22 of the same year became a Lecturer at the Royal College of Physicians at London. For this lower diploma he passed the usual three examinations, his examiners being Dr Christopher Pogg, Regius Professor of Physic, Oxford Dr Thomas James Dr John Aikin Fenn and Dr John Robt Johnson.*

This did not prevent him being Physician to

the Fleet in 1818 and in 1823 in 1828.

A sidelight on specialists is given in an extract:

**BLACKWOOD 1820** *Medical Inspector of the Navy*. On authorities of generalities of operations in the Medical Corps of the Navy. The Medical Surgeon General No. 1 February 1821.

The writer is directly critical to the appointment of specialists amongst the officers of the Medical Corps in general but he believes that all hospital and hospital ships should have the services of specialists, such specialists being members of the Medical Reserve Corps, that each hospital should have a *bachmeister* and a limited range of other staff and hospital have three men should be trained in their specialties and paid as such, they should not be in the Medical Corps or employed in the ship, other doctors in the medical service general after an experience of twenty years' service in the Navy serving through all the grades and then have a leave system to command of a hospital that the Naval Medical Officer is a specialist in the degree order in the ward that can reach or already expected of him outside his specialty and that is necessary men that specialists within specialties such as such a life and end study, is undoubtedly and absolutely indispensable in the maintenance of an efficient and homogeneous corps.

### Book Reviews

Amongst the books reviewed in *The Naval Emergency in medical practice* by Christopher Dr Richard Lenneman Read, *Physicians of the Commonwealth of Dartmouth*, translated from the third edition by Ronald C. S. Roche MD-Lond (London John Bale Jones and Dartmouth Ltd 1965, pp. 577, Price 11.00). This book

In the section on *Financing the winter campaign at great lengths* we learn from Belknap and Whitman his thoughts with regard to design and frequency of submissions by several top clinical units in port. The five papers devoted to food poisoning after each day's immersion. Under the heading of *Irreversible illness* one is disappointed to find no mention of cholera, although the author is a German. In spite of the Trousseau origin of this work we believe that its who-makes-it-compare-with-it? viewpoint on the process and often, *in spite of the help that occurred*. As the copyright has long since been sold, neither the author nor any other young doctor's *deeds and of his book*.

#### Admiralty Orders

The volume ends with a reprint of Admiralty Orders issued from August 1, 1944 to August 1, 1945. These included:

- 140 (P) 260 — patients suffering from Measles (Revised) (H 140 100) — (H 140 2)
- 141 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
- 142 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
- 143 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
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- 193 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
- 194 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
- 195 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
- 196 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
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- 198 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
- 199 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)
- 200 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)

140 (P) 260 — patients suffering from Measles (Revised) (H 140 100) — (H 140 2)

141 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)

142 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)

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156 The early onset of the Measles (Revised) (H 140 100) — (H 140 2)

So the clock again turns full circle with a list of DCOs appearing as a new feature in this number.

#### Appointments

It is amusing to see how the format of written German language changes over the years. In 1915 actual references to ships were printed as "in the German" or "in the German" and appointments were "in the German". In 1915 medical officers' appointments were recorded in the Journal and under numerous headings. Some names are German (Wieder, Wiegand) others are in ships whose names will live on — *British, German, Wiegand*.

Myers was caught by one in particular — the unfortunate officer appointed to the "Armoured Car Section, Warwood, London. Was he serving time? His next appointment followed — to the Vied for disposal which sounds as even more ominous fate. Did the appointment of personnel have anything to do with the disposal of ships? In even mightier fate to have?

My mind was set at rest concerning this list as other officers were appointed to "Warwood, London (H. A. Section)" and the disposal — was the list of ships a list of officers? Were they destroyed or available for redeployment?

Lastly a medical officer brought yet another appointment to my attention, that of Temporary Surgeon P. Dore for the Falkland Islands.

#### Service Plans

The last number in the volume gives the names of three officers awarded the DSO — Surgeons P. B. Kelly, M. H. Langford and B. A. Phipps — all for services in the Gallipoli campaign, together with 21 medical officers mentioned in dispatches. By the end of 1915 24 medical officers are recorded as having lost their lives in active service and several were prisoners of war.

# Memorabilia

## W. F. F. Gold

I do not always express gratitude, as this is not the British custom, but I feel that Captain Gold's letter is one which is well deserving the personal attention and consideration that it merits in the pages of a medical journal.

I did not join the Navy with any family connections or traditions behind me. The fact is that in 1933 when I qualified from St. Andrew's University Medical School in that town in Scotland there was a severe economic crisis in the country and with no National Health scheme doctors were not getting their fees paid. Thus I proved fortunate in doing three or more months' ship duty in the country of Nepal.

I took a deep breath and said: "I am going somewhere where I get a monthly salary", and on looking round nothing appeared to me more than a commission in the Royal Navy. I applied and was interviewed in London, accepted, joined HMS Malta in February 1933 and today I can safely say that I have no regrets. There was no planned induction. I was asked by a Surgeon Captain whether I could swim. I demonstrated and passed, with flying colors over the 100. There were no other new entrants and after one week's course I was considered fit for sea.

In May 1933 I joined HMS Scarborough which was commissioning in Chatham Dockyard for service on the West Indies Station. We sailed for Bermuda and remained on station for one year during which time I saw a great deal of both North American and South American east coasts. A memorable time came to a close in November 1935 with the end of the commission.

During my time I was called to see the appointed ship's medical officer. On being asked what I wanted to do, I replied: "Hospital work and preferably surgical." It

was pointed out that I must qualify in a general surgery first. For so those days the three main hospitals in the surgical side on the principle of one surgeon specialist and two residents to provide a one or three week-by-surgical emergency. I was told to go and study eyes and given the magnificent allowance of three months in which to do so. Pathology through that period I was warned that I would also be doing the medical side of the small hospital in Portland together with the anesthetist and a nurse. One slightly comic tale of this occurred one day when I was about to go on leave. A signal arrived from the local florist requesting urgent appointments for all then on-leave. I had great pleasure in seeing my Surgeon Captain to allow me to reply that all these operations were over on leave!

During my time there I wrote a thesis on typhopneumonia septicaemia based on material I had collected in the West Indies. I presented it to St. Andrew's University and was awarded my MD with honours. Later that same year (1936) I was awarded the Collier Bland Medal. I believe I remain the only Surgeon Lieutenant to gain that distinction.

Towards the end of 1936 I was due to join HMS Manchester as PMO and Ophthalmologist in the Far East Squadron and was drafted as the prospective head of the eye team at Chatham Dockyard, and I had to go there for six months' training. Eventually I joined HMS Manchester in Malta and served in the Persian Gulf for two years. It was not a pleasant station in those days before air-conditioning when ships became hot ovens overnight. Bored in a sense came with the outbreak of war in September 1939 when the ship was diverted to the West Indies carrying Australian troops across on their way to the Middle East.

On my arrival in UK, I transferred to the Gloucestershire from Barnaby and after a long long trip arrived in Liverpool in the middle of winter rain, and remained on leave at a

orders. When they came, I was told to take six months leave and attempt to get the Edinburgh Fellowship in surgery. This I managed to do in four months and was then appointed to liaise for 12 months between the P&I in surgery. During this period I married.

The failure of my appointment to P&I on this occasion coincided with ID Day when the hospital was using on the role of casualty clearing station and we gained enormous experience in general and eye surgery.

In due course I was appointed integral spending in MEDIC Typehospitals and so did a company from Liverpool in August 1960. We based the ship in Colombia and moved on to Transamerica to serve as the Eastern Fleet. Later we sailed to Australia to join up with the British Pacific Fleet just forming. At one period we were the only hospital ship available to serve the American Fleet and this was a quite unique experience.

At the end of the war we sailed into Tokyo Bay with the British Fleet and were present as the Japanese surrender. There resulted in our British and allied prisoners from the camps were arriving at the beaches and the docks, and needed help. With the assistance of my bargoon Captain I proceeded to Yokohama and single out the POW in General MacFarlane who rapidly agreed that we had a role to play. There were no harbour facilities so I arranged to go to help on both Typehospitals alongside. Trade was back with 40/50 yen/bak per day. Those who were fit enough were then sent immediately. Others were put on the first ship home and those requiring treatment were returned to our vessels until we were full up with 300 patients when we sailed for New Zealand and Sydney to refuel. We returned to Hong Kong to continue the care of the POWs but the supply had run out and we were redeployed to Shanghai where we were performed to transport 200 Sikh police and their wives back to Madras. From there we

took a large number of Army TB cases to South Africa and thence home docking at Liverpool February 1966.

And so to a spot of leave and my next appointment to Port Edgar for two years as ophthalmologist and specialist in surgery.

In 1968 I had the marvellous news that I was to go to Singapore and reform the Royal Hospital to RM Sick Quarters and then rename it RSHQ — this was a great job for someone of my age. We landed out Union Castle, full of hope, only to be greeted by a letter which said that the policy had changed and I was to reform the place down to a link day only with one LSOA and two SBAs. This greatest disappointment became a joke in the summer of that year when it was decided that RSHQ must introduce something very like the NHS early before it was too ill dependent on foreign spare parts. I was to assume responsibility for total care: GP, dentists, medical and surgical and the rest for the 4000 plus UK sick living there but there would be no increase in complement! I was eventually offered to retain the Wardmaster officer and to recruit a sister locally to help with the patients.

We spent these very happy years in Singapore gaining much in both administrative and professional experience. My general surgery was carried out at Wanchang Military Hospital (South Africa) and they were very helpful in every way. I was released in 1972 and retired home with my family which had increased by one while we were away.

My next appointment was another short stop. The Medical Department had been offered a place on the Staff Course at Greenwich the first time they had ever happened, and I accepted with some trepidity. On arrival at Greenwich in October 1972 I was conscious of a little reluctance, giving a few years of the experience on the Staff Course of someone with red hair on his nose! I was determined to convert such attitudes and did everything I could and appear

some other interesting birds. In the end I pinned out top of the coat on July 1953. It seems a pity that this also was dropped in 1958.

And so in another spell at Hader as both surgeon and ophthalmic specialist. This time I stayed four years and treated some of the Hader boys, always from my first line.

There was a happy accident in 1953 when I was appointed additional to the new Royal Naval Hospital for her maiden voyage carrying the two young Royal children to meet their parents in Malta. The children with Lieutenant General Bennett as their mother and grandfather joined the day before sailing... together with their nanny and governess. The morning after and I were invited to put up with this party in a small room in the Royal apartments. We had great fun, especially with the children who were intrigued with the novelty of ship life, and we all took part in entertaining it for them. I left the ship on arrival in Malta and rejoined in the Gull.

At the end of this period at Hader I was promoted to Captain and appointed Fleet Medical Officer Home Fleet on the staff of Admiral Sir John Ender. This was an interesting appointment but it was later repeated in September 1958 by the death of

my first wife which obliged me to seek for another appointment so that I could supervise a home for my two children of 11 and 13 years. I accepted the offer of a post at what was then called the Royal Naval Medical School as Director of Naval Research. It was not a good fit because as I am not terribly research minded and in any case there was clearly duplication of effort with a similar post in the staff of MEDNAV.

My next appointment was as PMO to the Submarine Branch in HMS Dolphin where I spent three very happy years in the company of the major branch of the Navy. In particular I interested myself in the living conditions and effected a happy one or two small improvements.

For my final two years I was appointed to RNM College which was being taken over from the Army. It was not a very two years. There were many headaches since we were trying to show that we could run the place on a much reduced complement. However the post had its compensations for it that time the leader was still open.

On approaching the age limit I was offered the post of Home Governor at Culverston House which I accepted and where I spent the next six years. And that is another story.

#### NEW COVER

The Editorial Committee consider it to leave the Gull's Cover had a new cover. Readers, whether subscribers or not, are invited to submit designs to the Editorial Secretary by January 7, 1960. These need only be in the form of a rough sketch, not finished artwork. Any entry or design would be appreciated, with a maximum of three. It is also intended that, commencing with the next volume the cover page will appear on the outside of the back cover.

## THE ROYAL NAVY MEDICAL CLUB

### DINNER 1962

The annual dinner of the Royal Navy Medical Club was held in the Painted Hall Royal Naval College, Greenwich, on Friday, September 20 1962 when 270 guests, and their guests attended.

The President, Surgeon Vice Admiral Sir John Harrison, KBE, QMP, FRCP, FRCS, FRMEd, Medical Director General (RNAL), made the following speech:

Commandant General Royal Marines, Admiral President of the College, our guests and members of the Club. I welcome you all to this historic hall.

Our principal guest tonight is Lordness of General Sir Stewart Pringle, an honour, honour and a warm thought which is a fortunate combination from our time a slight might be service. Through great courage and duty on his part and skilled medical and surgical care, he has made a remarkable recovery from the IRA bomb last year. His determination to do his job and work rather than his commitment, of his life after "vomping" across the Falklands. It is a great pleasure to have him with us tonight.

There are changing times and members have decided to select among QARNNS officers in membership of the Club and we welcome some of the new members here tonight. The QARNNS have a devoted men and are changing their rank rates. But let us be as Chief is still MINE which says her and I hope the tide runs in both out until retirement next year. It's good to have her with us tonight.

Our official guests of the Club tonight include Sir Henry Yellowless who supports and resources in the DHOSS but tells me he now feels the pinch of cuts. My sympathy is inspired by the feeling that a few hundred

excess would be raised less from the large than other than the survivors from our small time. There are two NHS regions where for the Navy in these measures would be enough but how to do it seems to be causing considerable difficulty. It's a pleasure to have Sir Henry with us tonight.

It is a pleasure to have with us Mr David West, the Assistant Under Secretary for Naval Personnel who gives us helpful advice, as did his predecessor, Terence Cullen and finally as men with polish and speed.

Professor Sir John Walton, President of the General Medical Council is with us tonight to represent the President of the Royal College of Physicians and Mr Joseph Taylor represents the President of the Royal College of Surgeons. Both are members of the Armed Forces Medical Advisory Board.

Comfortably associated in the body of the table are our doctors and with them is the Director General of Army Medical Services, Major General Pearson, and Group Captain Hume, representing the RAF, after the recent tragic death of David Lean. It's a pleasure to have them with us tonight. DPHS is with us for the last time in uniform and will be playing the organ in chapel for us at the end of dinner.

It's a pleasure to welcome some members of the Club and in particular Surgeon Vice Admiral Jack Hobbs and Surgeon Vice Admiral Hamford. Our warm thanks also extend to Sir Francis Avery Jones is with us tonight and my predecessor, Surgeon Vice Admiral Sir John Rawlin, and his guests, Surgeon Vice Admiral George Brown and his guest, and Surgeon Vice Admiral Ted Cadman.

It has been a warm year since our last dinner. The first six months saw the celebration of the Navy's month for recruitment by visiting people members — and people are our main asset. Vice Admiral Peter Harbord was charged with working the overall target reduction. He accepted on

promotion to be Flag Officer Submarines — and now wants more doctors. We didn't get off the book but we did reduce the target rate. The good relations established by Admiral Harbert between his department and mine proved despite changing personnel — and whether the rate is offered or not. One could be offered twice. It is a pleasure to have him with us as my personal guest, and Rear Admiral Derek Fitch who keeps a fatherly eye on our promotion.

Cats or no cats, our professional team grows and earlier this week I had the pleasure of attending the presentation on behalf of the Royal College of Physicians the Royal College of Surgeons and the Naval Medical Service of the Gilbert Blane Medal for 1981 to Surgeon Commander Colin Black.

In addition to the medals were cats for my people and our hospital beds. *Perseus* which has had a field day this year (Narcosis in *Perseus*) — but entry logs in reduced *Perseus* is belatedly by circumstances over the future — and also as an ending to the 10 year commission for his up a requirements — and ordered implementing service built for Surgeon Captain. We are in danger of being too late and too late to stop the loss of good people.

We have reorganised the links of Surgeon Rear Admirals for better management of our resources but if the rate go through these resources will be sufficient for the real tasks.

In April the agreement was changed. But as it was 'make do and mend' the parents' *Perseus* was partly possible and flexible and the meeting skilful and successful. The professional leaders board will be discussed at a United Services Section of the Royal Society of Medicine meeting at the Royal College of Surgeons in February in which all three Medical Services will take part. I hope many of you will come.

I need not tell you that the Falklands was possible, but not exclusively, a naval

conflict led by the Navy and the Royal Marines. Its only name *Coyotes* was well chosen and there was good inter Service co-ordination. Surgeon Commander Kirk Jolly has told us on TV of the splendid co-operation between the red and green land doctors which contributed to the great work of resuscitation and pain. Our joint support had the benefit of Lieutenant Colonel Mullington CBE and experience at Agas Bay. And therefore in the land battle the large RAMC from Australia arrived for 3 Regiments. It is therefore a special pleasure to welcome to our table tonight one who is anyway an old colleague of mine from our Service together in Oman — DGAMB, Lieutenant General Sir Alan Bray.

In *Coyotes* in order to provide medical support at sea to the RN, RFA, and Merchant ships, and on shore to the RM Commando we deployed about a third of the Naval Medical Service. Take all the other people there, they did well and fortunately — unlike the *KatBC* — none were killed though it seems that Surgeon Lieutenant Commander Robert Brown off *Andur* while treating a casualty was pretty lucky. He got into his once only out in the water and I'm sure he feels that such should live up to its name.

We had a simple policy but not medical support. At least one medical officer and medical assistant on every RM ship. Medical assistants with the RFA, and medical officers and medical assistants where required in Merchant ships. Support teams were deployed at sea and on shore with the Royal Marines.

Medically our aim was early surgery, the early provision of blood, and early specialist care of burns — the provision of the latter led by Charles Chapman in *Exmouth* which with us taught Twenty per cent of casualties were burns and most were treated in *Exmouth* before evacuation to UK.

We aimed to meet these medical requirements flexibly at sea, and on shore,

and Surgeon-Captains Young and Blackstone and Sub-Lieutenant Speedbridge did well in co-ordinating shore medical needs with the operational command. Crews did well to provide surgical support to the landing, and in unloading and caring for injured personnel under the MCHC. Surgeon-Captain Walton: "We saw on TV Back jolly and John Williams running the Royal Marines and preparing the ship on the way out. But *Olympic*, which we did not see on TV, was the back-jut and not safe for her and finally achieved — a general hospital at sea, under command and under equipped but with all the standards in function superbly executed she did with generalists teams under her MCHC Surgeon-Captain Russell."

It is a pity that the Red Cross and St John hospital welfare officers didn't join in as we worked at Ascension Island but they get short at the end. It is a pleasure to have Dame Anna Bryson with us tonight. And to thank the Commandant General for the splendid work of his headquarters in Canberra and Lyons.

It goes without saying that the helicopter pilots did sterling work, as did the flight deck crews in interesting storms and squalls. It is a pleasure to be able to thank Flag Officer Naval Air Command personally and Surgeon-Captain Oliver for Vice Admiral Sir John Cox with us on a good tonight.

Only our luck remains and it was brilliantly supplied by the ambulance ships *Sheik Alwan* and *Alfira* who ferried patients from *Olympic* to Montserrat for RAF aeromed evacuation to UK for distribution to each Service hospital, generally the one nearest the man's family and of his own Service. It is good to be able to thank the Hydrographer of the Navy for the use of his survey ships and Rear Admiral Hudson a host tonight to the good of *British Ferry*.

Our medical support worked well but only just. The Medical Supplies Directorate

did well. The remainder of our Service plus all RMR medical officers kept services going in UK. But the support was provided before the proposed case first been applied and the medical finished just in time and the casualties were lower than expected.

The Navy decided in January that it wants our Service to continue in its present form. To achieve that there are three clear needs which are not yet accepted.

Firstly we need to reinforce the facilities to develop and maintain our professional status, support comfort, casualty care training and the provision of specialist clinics etc.

Secondly we need to secure the doctors and beds and hospital beds we have now.

Thirdly we need a proper scale of equipment and resources for at least one designated hospital ship for a future conflict.

I believe the situation is serious but not yet irreversible.

I am reminded of a well-known telegram from Queen Wilhelmina, "Invasion seems most probable in flood cycles." To which the former naval person, the greatest English man of the century replied "Hold your water, madam, and press on!" — signed WC.

Certainly we must not be despondent but I hope that the achievements of the Royal Medical Service on the Falklands will speak louder than our past words.

That is fairly strong meat after an excellent dinner for which we thank the College staff and Commander Johnson and Admiral Cardil for having us — not more true?

Members of the Club: I ask you to rise and join me in a toast to our guests.

Lieutenant Colonel Sir Graham R. Fringle, BA, RCB, Commandant General Royal Marines, spoken on behalf of the guests.

Admiral Hurren, ladies and gentlemen — how nice to be able to say that at this dinner I come to that evening more calm.



ready broiled than I can recall being on any previous occasion. I have had three venison loins and two venison steaks but none of them has answered the question, why I am here at all!

Something my aunt for the answer, I suppose that I am this year's most obvious symbol of your trade and perhaps I am to you what the peasant boy I am making an occupational therapy at Farnham Park is to me. If so, I must tell you that my peasant boy is more highly polished than yours.

Most of my friends told me that I should make a short but colorful speech, shortly giving me the same sort of problems as Lord Chamberlain set his men. They thought that I should propose the health of the club, more of this later, but I must observe in passing that I thought immediately in the Royal Navy had moved on from there.

The last brief which I received this afternoon says in part, and I quote, "We usually print the piece of hamper's speech in the Journal of the Royal Naval Medical Service. I appreciate that you may be speaking off the cuff, at least in part. I would be most grateful if you would let me have a copy of what you would like to appear on paper." Well then, I hope you have your type machines running.

Extensively lauded I certainly was, but I find myself completely unprepared. Your friends of the Royal Navy and the Royal Marines have put on such stern faces and so surely polished were the past year that I know that anything I might propose would be likely to be preempted by Admiral Harrison as his remarks and as it has turned out. So I will leave myself to confessing and highlighting some of the things he has said.

Early in the year just ending, as a result of a proper search for manpower resources, we were both being shuffled over the way we did things and, indeed, in the case of the Royal Marines, whether it was any longer necessary for what we do to be done at all.

Now that has all changed, with the need for our special skills being so clearly demonstrated in the Falkland Islands.

You will all know how much the Royal Marines love the Royal Navy and that we have a special affection for the members of the Medical Branch, the first-rate Officers and the Chaplains who came with us, and could not command. For the last eleven years or so we have been struggling to get the organization and level of medical support needed by 3 Commando Brigade right. That is not to minimize the skill, dedication or compassion with which it has been done but we have lost the actual combat experience on which to base our future case.

There is nothing I need say about the medical staff shown in the Falklands, but the military skill of the medical personnel was of a high order too. A month or so ago I was talking to one of my Marines in Rascia who had lost a leg on a mine while on a night patrol. When I asked him how long it was before he was in the hands of proper medical attention, the answer was one minute, there was an MLC on the patrol. I cannot speak highly of the military skill that is shown.

In all these circumstances, it gives me great pleasure to be here tonight and to be able to say to you all, in Commandant General Royal Marines, thank you.

Of course there is a long list of people to whom thanks are due. A name and place will come for that but I am especially pleased that Flag Officer Submarines and Flag Officer Naval Air Command are both here tonight. Not only do they deserve the thanks of the Corps, they are both old personal friends and, most importantly, they have both been POW's.

Finally I return to the Royal Navy Medical Club. Thank you for inviting me, I am sure all your guests in our staff will me, wish the health of the Royal Navy Medical Club.

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**GENERAL MEDICAL AND DENTAL OFFICERS**

The following professional appointments are announced:

**Senior Specialist**

*Opthalmic Surgeon*  
Suptent Captain R. B. Proctor  
Suptent Lieutenant Colonel G. A. Hayes

**Specialist**

*Anaesthetist*  
Suptent Lieutenant Colonel G. A. Taylor  
*Applied Physiology*  
Suptent Lieutenant Colonel G. J. Davis  
*Cardiac Medicine*  
Suptent Lieutenant Colonel G. A. B. G. Miller  
*General Surgery*  
Suptent Lieutenant Colonel G. W. Bennett  
*Gynaecology (Gynaecology)*  
Suptent Lieutenant Colonel G. J. G. D. Taylor  
Suptent Lieutenant Colonel J. Wright  
*Otolaryngology*  
Suptent Lieutenant Colonel A. P. P. P.  
M.D.S.D.

**ROYAL NAVAL RESERVE****NAVY LIST**

Suptent Lieutenant G. B. Davies (P.W.S. List 6)

**ENTREPRENEUR**

Suptent Lieutenant G. B. Davies (P.W.S. List 6)

**MEDICAL SERVICE OFFICERS****PROVISIONS**

*To Lieutenant Commander*  
T. J. G. Taylor

*To Acting Sub Lieutenant*  
T. J. G. Taylor

**ENTREPRENEUR**

Suptent Lieutenant G. B. Davies

**QUEEN ALEXANDRA'S ROYAL NAVAL  
NURSING SERVICE****Queen's Medical Service**

*Acting Med Officer (Acting)*  
Miss E. M. Matthews, Principal Nursing Officer

*Acting Med Officer (Acting)*  
Miss J. H. Thomas, Acting Nursing Officer  
Miss J. H. Thomas, Acting Nursing Officer

**APPOINTMENTS**

*To Acting Nursing Officer (Acting)*  
Suptent Medical Officer (Acting) (P.W.S. List 6)

**PROVISIONS**

*To Acting Nursing Officer*  
Miss E. M. Matthews, Principal Nursing Officer

**To Acting Nursing Officer**

Miss E. M. Matthews, Principal Nursing Officer

**PROVISIONS**

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the 1990s, the number of people with a mental health problem has increased by 50% (Mental Health Foundation 2000). The prevalence of mental health problems has increased in the general population, and the incidence of mental health problems has increased in the prison population.

There is a growing awareness of the need to address the mental health needs of prisoners. The Department of Health (2000) has published a strategy for mental health services, which includes a commitment to improve the mental health of prisoners. The Department of Health (2000) has also published a strategy for mental health services, which includes a commitment to improve the mental health of prisoners. The Department of Health (2000) has also published a strategy for mental health services, which includes a commitment to improve the mental health of prisoners.

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